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As the Editor Views the News

PROBABLY the strongest argument that has been directed against the Black-Connery 30-hour bill was that presented by Ralph E. Flanders in the public hearing on employment provisions in codes of fair competition. The president of the Jones & Lamson Machine Co. came into the picture right after William Green had reiterated in great detail the reasons why A. F. of L. is supporting the 30-hour week proposal (p. 16) "with all the strength at its command." After terming enactment of the short-week law "a deathblow to recovery," Mr. Flanders declared the real problem is to discover . . . . "means by which we may more generously distribute a larger output."

• • •

Protect, Trust Profit System!

"The way out," he said, "lies not to the right or to the left but straight ahead. The profit system, which has served us well until now, has yet greater gifts in store for every worthy citizen if we will but accept it wholeheartedly. . . . For further advance, . . . three things are necessary. We must understand the profit system, we must protect it, and we must trust in it." Here, in four succinct sentences, is distilled the essence of what is wrong with the viewpoint on which much of the new deal is founded. When new dealers learn to understand, protect and trust the profit system, recovery will proceed rapidly.

• • •

Shifting Season by Edict

Extending the term of the automobile code, retaining the labor board and introducing amendments shifting the timing of new models and increasing pay for overtime (p. 21), President Roosevelt presumably acted to impose the least possible disturbance to the current swift rise of activity in that industry. From short range, the action may be considered favorably by employers and by the majority of employes. Professional labor organizers, of course, will be disgruntled, in spite of their poor showing in the auto plant voting. However, from the long-range view it is possible that the introduction of models in the fall instead of in January may not bring about the leveling of employment to the extent expected. On the contrary, it may introduce serious new dislocations. We doubt whether such sweeping changes can be accomplished satisfactorily by governmental edict.

• • •

Gains Better Than Expected

Few industrialists can complain of the extent of business improvement in the first month of 1935. The rise in industrial activity (p. 28) exceeded expectations. One of the best indicators of the substantial character of the present upturn is furnished by STEEL's monthly compilation of pig iron production (p. 19), which, aside from reporting an increase for January of 43.6 per cent in output, shows that 22 stacks were blown in during the month. The only January in which a larger number of furnaces were lighted was that of 1920, when 23 were blown in. . . . Sudden collapse of the trade negotiations between the United States and the U. S. S. R. may prove to be a setback to American exports of iron and steel products to Russia (p. 17), which have been increasing encouragingly in recent months.

• • •

More Proof of Edison's Genius

Fabrication of steel for use in the elements of nickel-iron-alkaline storage batteries involves a much more imposing array of special equipment and processes than is generally realized. The methods and organization developed at an eastern storage battery plant (p. 30) are interesting, not only because they are the result of an unusual amount of research, but also because they embody many processes and detailed operations conceived by the late Thomas A. Edison himself. This revelation of his contributions to mass production technique again emphasizes the amazing versatility of the wizard of Menlo park. The method of producing pure nickel flakes for filling the positive tubes of the battery cell (p. 32) is a striking illustration of the inventor's ingenuity.

E. L. Shaner

Labor's Demands Threaten To Accelerate Obsolescence

NOT only is the iron and steel producing industry approaching a period of mandatory modernization, which some estimate will entail an outlay of four to five billion dollars over the next few years, but the entire metalworking industry may also be compelled, by organized labor's insistence on a shorter work week, to further modernize and mechanize.

At Washington last week, during the NRA hearing on employment provisions of codes, labor leaders headed by William Green, president of the American Federation of Labor, served notice that unless industry voluntarily concedes a 30-hour week through codes congress will be besieged for it.

Despite assurances by Mr. Green to the effect that studies by experts of the federation show the expected increased efficiency of workers under the shorter week will prevent any increase in unit costs, industry's first reaction was that its costs indubitably would be raised, and very likely to the point of stifling demand.

More Pressure on Costs

The alternative for industry, as a matter of self defense for itself and the buying public, appeared to be a further attempt to whittle down costs, with labor the most vulnerable item because the largest. A hint of what might be expected was proferred by one representative for the machine tool industry, who volunteered that only by retaining the most effective men and machinery had his company weathered the depression.

While congress is unpredictable, labor's demands for a 30-hour week and industry's stand on a 40-hour one indicate a compromise somewhere between these limits. At present, the average week under codes is approximately 40. The trend, if anything, is downward. There was no open discussion, naturally, at this stage, but some speculation that labor would only frustrate itself, and the shorter the week the more industry must mechanize.

May Cut Off Own Nose

As expressed by one observer, it would be a peculiar twist of fate if labor in marshalling its strength for a shorter week in order to spread employment, should unwittingly set in motion a wave of mechanization which would supply the equipment and machine tool portion of durable goods industries with the filip it so sorely needs.

So far as modernization of the production end of the steel industry is concerned, equipment makers almost weekly grow more optimistic over the outlook. In point of actual orders, United Engineering & Foundry Co., Pittsburgh, last week booked a single stand 4-high cold mill for the Detroit Steel Corp., Detroit.

Bethlehem To Let Mill

Confirmation that the Bethlehem Steel Co. will shortly let contracts for new sheet and strip making capacity, presumably a continuous mill,

J. S. Ervin
President, Mackintosh-Hemphill Co.

at Lackawanna (Buffalo) N. Y., was issued by Eugene G. Grace, president, following the directors' meeting Thursday. This means an expenditure of about $20,000,000.

This new equipment, which contemplates the almost total abandonment of operations at the Seneca plant of Bethlehem at Buffalo, will be for the production of all classes of black, cold-rolled and galvanized sheets and a full range of strip steel up to 72 inches wide.

An expenditure of practically the same magnitude is being considered by the National Steel Corp. at its Great Lakes division in Ecorse, Mich., a suburb of Detroit. If the Carnegie Steel Co proceeds with its rehabilitation of the Edgar Thomson works at Braddock, another large outlay is in sight.

A Middle West wire mill is placing additional equipment. A blast furnace and coke oven plant is being figured for Mexico. Counting all of the smaller miscellaneous work that runs through a long list of mill parts and revamping existing equipment, more than $50,000,000 worth of business has come out for active estimates within the past two months.

Following the recent statement by Arthur G. McKee, Cleveland, (STEEL, Jan. 28, p. 10) STEEL has carried its search for statements of the accurate extent of modernization to executives of the country's leading equipment manufacturers. They confirm the grip that obsolescence has on the industry and the glutton steel is for capital replacements.

Many Ask for Figures

"We feel extremely hopeful that a vast majority of present heavy inquiries will develop into orders," stated J. S. Ervin, president of Mackintosh-Hemphill Co., of Pittsburgh, to STEEL last week.

"Only within the last five to six weeks we have submitted prices on new work for steel rolling mill operators that totals upwards of $30,000,000. This is virtually three times the value of the volume of the inquiries we had before us a year ago at this time.

"Many new orders will be for strip mills, there is also some good inquiry for universal plate mills and we also look for some rod mill installations to be made. In addition, several attractive export orders should result from negotiations now under way with a Japanese buyer for at least a large merchant mill and an equally sizeable hot-strip mill; there are some Australian buyers in the market and we believe Russia will close on certain long-standing inquiries. All in all, the situation as to new business developing looks to be very encouraging."

Sees Estimates Low

STEEL also asked George T. Ladd, president of United Engineering & Foundry Co., Pittsburgh, his opinion of prospects. He said:

"So far as we have been able to learn, no itemization has been made of the steel industry's recent pledge that amounts in aggregate to around $125,000,000 and which is to be spent for new equipment in 1935. This simply represents a sum total of what the individual companies reporting to the American Iron and Steel Institute expect to spend. Unquestionably, it is a modest figure.

"However, we can logically assume that hot strip, continuous sheet and

tin plate mills will, as in 1934, be the most prominent among the new rolling mill installations purchased. There are several inquiries of this nature that are very promising at the moment. Obviously, our trade will look for blooming mills to accompany this type of improvement, but there is little present prospect for new rail or structural mills to be bought.

"Much of this latter type of work, however, is in prospect for eventual fulfillment. For example, the United States Steel Corp.'s plans for the so-called 'heavy' mill improvements are indeed vast. When and if they are released to any extent in 1935, the $125,000,000 total that the Institute estimates, would be considerably swelled."

Throughout the entire discussion of rolling mill equipment prospects there was a tinge of conservatism in Mr. Ladd's outlook. This hinged on financing of these new steelmaking improvements for as is well known, many steel producers are in a position to urgently need new facilities, but the depression's drains of four years have greatly impaired their working capital's status. He said further:

Frank Cordes
President, Lewis Foundry & Machine Co.

"Until there is some relaxation of the recent securities legislation, or until the steel industry itself begins to operate on a level for a long enough time to enhance its own current position, the vast and unestimable potential volume of new steel mill equipment buying is likely to have certain restraining factors. Yet, at the same time, it is quite evident that much work, especially continuous strip mills, is proceeding out of urgent and immediate need.

"We feel hopeful for 1935 and

George T. Ladd
President, United Engineering & Foundry Co.

longer and believe that progress — while it seems slow at times — is being made in the attendent factors, mainly one of finances, to assure modernization of the country's steel mills," Mr. Ladd concluded.

"At the moment we have pending more proposals for replacing obsolete equipment and for new mills than at any time in the history of Lewis Foundry & Machine Co.," Frand Cordes, president of that company, said last week.

"It is not possible to state with any degree of accuracy what demand a modernization program in the steel plants would create for rolling mill equipment. This figure would depend on the judgment of the steel plant officials as to what investment would be justified in view of their own surveys as to the present and future demand for steel products. It is indeed vast, considering all potentialities inherent in the situation.

Realizing Opportunities

"The interest shown at present in improved rolling mill equipment would indicate that the steel companies are taking advantage of the present increased demand for steel to install improved designs of rolling mill equipment where they deem such installations would be a means of better and more economical production," Mr. Cordes concluded.

"Our recent bookings have not only been extremely heavy and our unfilled orders imposing, but judging from the almost impossible delivery requests steel producers are now making for certain new mill equipment we would judge that a vast amount of new equipment business is urgently needed," stated a Mesta Machine Co. official recently.

A. E. Gibson, vice president of the Wellman Engineering Co., in answer to a question as to his knowledge of the obsolescence of the iron and steel plants of America and the extent to which extensive reconstruction must be made in the near future, said:

"From our certain knowledge there would seem to be a widespread and universal feeling that repairs, replacements and new equipment in large volume are going to be required at an early date in the iron and steel plants in the country to maintain them in a competitive condition.

"There is plenty of evidence that this is shown in some measure by the character of the financial reports of some of these plants.

"There are, of course, many plants highly modernized for the manufacture of steel of a nature that has not been needed since the depression began, but again there are manufacturers who very freely admit their disadvantage in this respect.

"Some of the equipment of the latest design is most marvelously automatic, but in every department of iron and steel engineering we hear every day of prospective business of a reconstructive character that will soon be placed if we have a generally stabilized business condition."

A. E. Gibson
Vice President, Wellman Engineering Co.

TVA

DRAFTSMEN familiar with the design of blast furnaces are desired by the Tennessee Valley authority, Knoxville, Tenn., in connection with the building of a blast furnace near Knoxville for the smelting of phosphate ores found in that region. The stack is to be the equivalent of a 350-ton blast furnace.

Industry Firm for 40-Hour Work Week; Labor, Hitting NRA, To Fight for 30

INDUSTRY and organized labor locked horns at the hearing on employment provisions of NRA codes, staged last week by the national industrial recovery board to supplement the hearing early in January on price provisions of codes.

The issue was joined by the first two speakers—William Green, president of the American Federation of Labor, and Ralph E. Flanders, president of the Jones & Lamson Machine Co., Springfield, Vt., on this basis:

Labor demands are (1) a 30-hour week either through NRA codes or by statute, (2) increases in wages to maintain the present level of weekly earnings, (3) labor representation on all code authorities, and (4) payment of minimum wage rates to substandard employes.

Frowns on "Code Rigidities"

Industry's proposals are (1) a 40-hour week with time and one half up to 50 hours and double time over 50 hours, (2) elimination of all exceptions to the maximum work-week, including seasonal exceptions, (3) continuation of the profit motive with adequate compensation for the risk of enterprise, and (4) elimination from codes of rigidities which have hampered recovery in comparison with comebacks from previous depressions and in other nations.

Between Mr. Flanders, who is gaining a reputation as industry's foremost spokesman, and Sidney Hillman, member of the recovery board, developed a debate which went to the roots of the depression and exposed the underlying thinking of both employers and labor. Obviously no decision was rendered, but applause of the audience appeared evenly divided.

Ralph E. Flanders

Chief among the declarations of Mr. Flanders, both in his original presentation and in his debate with Mr. Hillman, were:

The air clears and the problem simplifies, when we remember that a recovery, to be real, must be expressed in terms of an increase in the production and distribution of goods and services. A further shortening of hours cannot possibly produce such an increase. A further shortening would obviously produce a decrease.

At the peak of production in 1928 and 1929, with our normal productive capacity 80 per cent engaged, with our available labor supply more than 80 per cent employed at an average of hours per week at least 25 per cent greater than the hours set by the codes, we were still unable to provide a standard of living for the mass of the people which was up to our physical possibilities or to their deserts. By what magic process can we hope even to equal that unsatisfactory record, if we cut 40 per cent or more off the old working week, as is now proposed.

The way out lies not to the right or to the left but straight ahead.

Understand, Protect, Trust

The profit system, which has served us well until now, has greater gifts in store for every worthy citizen of this country, if we will but accept it wholeheartedly, and learn to maintain it in healthy activity. For further advance, a wider spread of benefits and a steadier operation, three things are necessary. We must understand the profit system, we must protect it, and we must trust in it.

No paltry 5 or 6 per cent is sufficient as a basis for our needed expansion of business enterprise. That will barely pay the bank interest—and enterprise is full of risk. It is the prospect for 10, 20, 50 per cent profit that makes the justifiable risk, opens the sluice gates of bank credit, expands employment and multiplies the production and distribution of goods. It is useless to scold banks and business for not expanding or risking money when it is wrong to lend and dangerous to borrow.

For raising wages there is no expedient comparable to an active demand for workers from profitable business.

Recovery is the production of a larger volume and variety of goods and the furnishing of a larger volume and variety of services, the employment of a larger number of workers thereby, and the distribution to these workers of a larger volume of the goods produced and the services furnished.

Serving notice that labor "this year is supporting with all the strength at its comand the Black-Connery bill providing for a 30-ton week," Mr. Green declared this action resulted from failure of the recovery program to fulfill what labor considered its two primary purposes —"a reduction in hours of work sufficient to absorb at least a majority of the unemployed and an increase in mass purchasing power, sufficient to create a market for the products of industry and to give workers the minimum goods and services to which any human being is entitled."

Other labor spokesmen, including John Lewis, of the United Mine Workers, Francis Dillon, organizer of the automobile industry, who said he would never again advise automobile workers "to refrain from using their economic powers," and representatives of unions ranging from the machinists to bartenders, supported Mr. Green's minimum demand of a 30-hour week.

Speakers for the industry side included Charles R. Hook, president, American Rolling Mill Co.; John W. O'Leary, chairman, the Machinery and Allied Products institute, and Roscoe Edlund, representing the consumers' goods industries committee.

Mr. Hook said "the only way to get real employment is to thaw the capital goods securities market by modifying the restrictions placed on the lending of capital to exploit the durable goods industries. We have to depend upon capital if we are to maintain the American standard of living."

Although the iron and steel code

Keystone Honors Him

EMPLOYES of the Keystone Steel & Wire Co., Peoria, Ill., Feb. 4 honored W. C. Buchanan, general manager of the company by presentation of a plaque in the name of the Keystone Employes' association. The plaque was signed by the association's officers as well as more than 100 Keystone executives, officers and directors. Mr. Buchanan went with Keystone five years ago and was shortly thereafter made general manager

established a maximum 40-hour work-week, averaged over a six-month period, he declared the experience during the past 17 months has been that it is not possible "to give our employes the maximum hours of work permitted under the present limitation. During 1934 our employes actually averaged only 32 hours a week. This is primarily due to the fact that with better than average operation we must carry a large number of men who are not normally required."

Turning to the 30-hour week, Mr. Hook said, "at 70 per cent operations this would require about 700,000 employes, or double the present number in the industry. Such a condition is unthinkable for the reason that no such supply of experienced workers is available in the country."

Bulbs Sign of Recovery

INCREASED demand for electric light bulbs, especially 200 and 300 watts, from iron and steel companies is reported by bulb manufacturers. Some mills need bulbs because they are now working night shifts. Others are relamping departments which have not been operating. One mill department in the Pittsburgh district, which was delamped except for watchmen's lights, is now being entirely relamped. Plant inventories of bulbs also are being expanded.

Foreign Trade

ALTHOUGH Secretary of State Hull and Russian Ambassador Troyanovsky apparently have broken off negotiations looking to a settlement of the Russian debt preparatory to more active trading between the two nations, the break is not regarded as final. There have been several "final" terminations of negotiations in the past year.

There is no barrier to private trading. Settlement of the billion dollar debt, which Russia has offered to effect for 10 cents on the dollar, would remove the soviet government from the Johnson law ban, and an extension of government credit to prospective sellers to Russia.

Russia recently has distributed some small lots of materials and equipment, paying cash. Only last week the Carnegie Steel Co. booked 4500 tons of wheels and axles. Some machine tool makers, including the Jones & Lamson Machine Co., Springfield, Vt., have closed business recently. Substantial tonnages of sheets, tin plate and cold-drawn steel are pending.

Labor

IRON and steel producers in 1934 paid $457,842,517 in wages to an average of 409,349 employes throughout the year, an annual average of $1118, according to the American Iron and Steel institute.

December statistics are: Employes, 386,345; payrolls, $35,362,732; hours per week per employe, 28.4; average earnings per hour, 72.9 cents; operating rate, 35.26 per cent.

AMERICAN WAGES LEAD WORLD

Comparing steel wages in the United States with those abroad, as ascertained by the department of labor and the league of nations, the Institute finds the American industry pays 120 to 650 per cent above the foreign average. A comparison of the American rate for 1934 with the latest available rates abroad follows:

Country	Average Hourly Wage Rate Cents	Date
United States	64.7	1934
Belgium	17.0	1933
Czechoslovakia	22.7	1934
France	20.0	1933
Germany	25.9	1934
Great Britain	25.1	1933
India	8.6	1933
Italy	27.6	1933
Japan	9.7	1933
Sweden	29.0	1932

Merger

FOLLOWING several weeks of rumors linking National Steel Corp., Pittsburgh, with Inland Steel Co., Chicago, E. T. Weir, chairman of National, declares that these rumors are unfounded at present.

L. E. Block, chairman of Inland, is now on his way to California; another important member of the Block family is in Florida; Mr. Weir is leaving shortly for Bermuda, and J. C. Williams, president of the Weirton Steel Co., leading National

What Ludlum Makes, They Sell

Shown above are the sales department personnel and the district office and agency salesmen of the Ludlum Steel Co., Watervliet, N. Y., at the annual conference of salesmen, Jan. 18 and 19, at Albany, N. Y. Guest speakers in addition to President Batcheller and other officials of Ludlum, included Charles R. Hook, president, American Rolling Mill Co.; E. B. Cleborne, president, Wallingford Steel Co.; F. C. Crawford, president, Thompson Products Inc.; F. C. Gifford, vice president, Acme Steel Co.; Frank R. Frost, president, Superior Steel Corp.; W. J. Brinkerhof, of United States Steel Products Co. An unusual feature at the banquet was that five presidents or vice presidents of the so-called competitor companies, who also are customers of Ludlum, were in attendance. Results of a recent sales contest conducted by Ludlum were announced. Bachrach photo

subsidiary, is in Hot Springs, Ark.—a convincing scattering of the principals.

REPUBLIC MEETING OFF AGAIN

After twice postponing the meeting of stockholders called to pass upon the plan for acquiring the Corrigan, McKinney Steel Co. and Truscon Steel Co. and recapitalizing itself, the Republic Steel Corp. has indefinitely postponed the meeting scheduled for Feb. 5.

Imminence of the United States Supreme Court decision in the so-called gold clause case makes impossible the completion of arrangements for floating bonds, which are an essential phase of the financial reorganization.

At present, approximately 65 per cent of the preferred and the necessary two-thirds of the common stock have been pledged favorably to the merger and reorganization plan.

Production

WHEN steel production increased 1½ points last week to 54½ per cent, it came within 7½ points of the peak of last year and was 18½ points higher than in the same week of 1934. While there are indications of a further gain this week, the rising curve is tending to flatten out.

Although bookings continue heavy in the Youngstown district, the rate last week held unchanged at 64 per cent and valley mills plan to open this week at 62 per cent, with a higher ingot output likely by Feb. 15.

With 17 open hearths in production, the largest number since last June, Buffalo steelworks pushed up 1 point to 45 per cent last week. February is expected to maintain at least the current rate. Birmingham also eased up a half point to 32 per cent, and there is some indication that three or four additional open hearths will be put on.

Up 6 points to 44 per cent, Pittsburgh operations were the highest since early in June, 1934. Carnegie Steel Co. blew in one Carrie and one Edgar Thomson blast furnace, making a total of 23 active. Wheeling remained unchanged at 95 per cent, being at virtual capacity. Wheeling Steel Corp. is scheduling capacity bessemer operations at its Benwood works beginning this week and is also placing an additional pipe mill in operation.

Chicago achieved its highest average since 1930, with the exception of a few weeks last June when mills were completing shipments against old contracts, reaching 66 per cent. Fourteen blast furnaces are now active. Eastern Pennsylvania recorded a gain of 1½ points last week to 30 per cent with a slight increase expected this week. Ingots are accumulating at some points, as steelmaking

Advertising Should Be Specific and Keyed to Realities

SPEAKING before the Pittsburgh Advertising club, Jan. 29, L. S. Hamaker, vice president and general manager, Berger Mfg. Co., Canton, O., emphasized the importance of keying industrial sales and advertising effort to the realities of the business situation.

Mr. Hamaker, who formerly was advertising and sales promotion manager of the Republic Steel Corp., declared that selective selling demands careful market study.

"I have always found it possible to secure an adequate advertising appropriation for any job if it was specific enough and I had the facts and figures to support it."

The speaker stressed the fact that the size of the advertising appropriation is not an accurate criterion of the effectiveness of the advertising campaign. "I know of several excellent advertising jobs being done at relatively small expense — well planned, selective programs doing a specific job. General ballyhoo has its advantages, if you can afford it. I also realize that there sometimes are policy reasons for doing a broadcast advertising job, but it is the day-in-and-day-out, month-after-month concentration on known markets that brings home the bacon.

Quality and Persistence Win

"It may not be spectacular. It probably will not be handsome physically, but if it is telling a good story persistently to an industry or to a group of prospects to whom that story is of definite personal interest, it simply cannot fail."

In emphasizing the need of basing advertising plans upon realities, Mr. Hamaker declared that "to make intelligent plans for advertising or anything else, one must make up his mind as to the outlook during 1935 for his particular business." His own view is that the steel industry will have a "15 per cent better year in 1935, with most of the relative improvement in the second half."

Sees Building Pick-up

After discussing the outlook of the automobile, railroad and general industrial fields from the standpoint of steel consumption, Mr. Hamaker delved into the building situation. He suggested that "a 33 per cent gain in total construction is a reasonable guess for 1935, with home and industrial building showing the greatest relative advance."

A real building boom based on private investment, he believes, is a fair possibility in late 1935 and a good possibility in 1936. "Even moderate recovery in home building from today's low depths will mean greatly increased business," he said. "Several steel companies, including our own, are conducting experiments which point to a much larger use of steel in small house construction. We hold no briefs for the 'all-steel house', but at Berger we are working on a low-cost steel frame construction which may conceivably become a standard article of commerce in the building business. If quantity production can be reached, the cost will be less than ordinary wood construction for a home of high durability, comfort and fire safety.

"In view of this fact, I think we not only may safely expect much more construction in 1935, but that the steel industry may expect to play a much larger part in the home building picture than it ever has before. We feel that if our experiments lead to the use of 1½ or 2 tons of steel in a small home, which is more than an automobile contains, we shall have made a very notable contribution to the steel industry as a whole.

"Billions of dollars will be taken out of the building industry in the next few years and a market of such proportions is worth every ounce of sales ingenuity that can be applied to it. The biggest obstacle is the cost of building labor. Another is not necessarily the unwillingness of the banks to lend money but the reluctance of the average citizen to assume a long-term debt. Until his confidence is restored, I do not expect private capital to enter the home-building industry in any large way and that is why it will be early 1936 before home building gets started in a normal way without government help."

Advertising More Important

In conclusion Mr. Hamaker stated that most business men know or sense that we are in for several years of progressively better business. "Well considered advertising," he asserted, "will play an even more important part in the recovery picture than it has in the past. Poorly considered advertising of the shot-gun type will be almost a curiosity by the time our next prosperity period arrives."

production has exceeded finished steel requirements.

New England went off 16 points to 52 per cent last week, but a rebound to 60 to 65 per cent is expected this week. Due to one unit being taken off by Corrigan, McKinney Steel Co. for repairs, the Cleveland--Lorain district dropped 1 point to 78 per cent. Otis Steel Co. continued with 7 and National Tube at Lorain with 11. Corrigan-McKinney and Otis will each light one unit this week, advancing the rate to 82 per cent.

Operating at 100 per cent, Detroit held unchanged.

American Sheet & Tin Plate Co. has opened its sheet mill at Sharon, Pa., closed since the spring of 1934, and is finishing breakdowns shipped from the Gary Works.

Steelmaking Operations

Percentage of Open-Hearth Ingot Capacity Engaged in 10 Leading Districts

	Week ended Feb. 2	Change	Same week 1934	Same week 1933
Pittsburgh	44	+ 6	19	17
Chicago	66	+ 7	31	19
Eastern Pa.	30	+ 1½	25½	11
Youngstown	64	None	41	20
Wheeling	95	None	64	†
Cleveland	78	— 1	69	38
Buffalo	45	+ 1	34	16
Birmingham	32	+ 0½	52	20
New England	52	—16	82	†
Detroit	100	None	79	†
Weighted av.	54½	+ 1½	36	19

†Not reported in 1933.

CANADA UP IN DECEMBER

Canada's pig iron output for December totalled 42,364 tons, compared with 38,968 tons in November and 38,612 tons in December, 1933. Production included 11,136 tons of malleable, 4591 tons of foundry and 26,637 tons of basic iron.

The month's output of ferroalloys totalled 3641 tons, against 8778 tons in November.

Production of steel ingots and direct steel castings, at 58,732 tons, showed an increase over the November total of 57,050 tons, and the December, 1933, total of 49,557 tons.

Financial

CLOSING its books for 1934, the United States Steel Corp. sums up its deficit, after all charges and dividends of $2 per share on the preferred, as $28,906,526. In 1933 the comparable loss was $43,706,745.

In the fourth quarter the deficit

(*Please turn to Page* 91)

Pig Iron Gain Largest for Any January; 22 Stacks In

WITH a net gain of 22 active blast furnaces, January production of coke pig iron in the United States made the largest tonnage increase for any January since statistics were first compiled nearly 30 years ago. Furthermore, in only one other January were more blast furnaces placed in operation, this being January, 1920, with 23 units resuming; January, 1925, made an equivalent gain of 22.

Total production and average daily production both registered increases of 43.6 per cent over the December figures. According to statistics collected partially by telegraph and with producers estimating tonnages for the last one or two days of the month, total production for January was 1,476,424 gross tons, this bettering the December total of 1,028,006 tons by 448,418 tons. The gain made in January, 1925, was 415,818 tons. The January, 1935, output was the highest since last June with 1,936,897 tons and was materially better than the 1,225,643 tons made in January, one year ago.

Average daily production in the month just closed was 47,627 tons, which compared with the December rate of 33,161 tons per day, was an increase of 14,466 tons. The next largest gain for any January was in 1925 with 13,414 tons. The January, 1935, daily rate was the best since last June with 64,563 tons and was over 20 per cent better than January, one year ago, with a rate of 39,537 tons per day.

Relating production to capacity, operations in January were at the rate of 34.1 per cent, as compared with 23.7 per cent in December, and 22.8 per cent in November. The rate was the highest since last June with 46.3 per cent and compares with only 28.3 per cent in January, 1934.

Blast furnaces producing iron on the last day of January totaled 89, as against 67 on Dec. 31, the increase being 22 furnaces. Comparative figures are 60 in November, 65 in October and 61 in September. The January total was the best since last June with 92 and 3 better than January, 1934, with 86.

During the month, 26 stacks resumed operations and 4 were blown out or banked. Of the steelworks or nonmerchant class, 25 were made active and 4 were banked, with a net gain of 21. Of the merchant class, 1 furnace resumed and none was blown out.

Furnaces blown in during January were: In Ohio: Lorain No. 2, Na-

AVERAGE DAILY PRODUCTION

Gross Tons

	1935	1934	1933	1932
Jan.	47,627	39,537	18,348	31,336
Feb.		45,385	19,752	33,122
Mar.		52,438	17,484	31,194
Apr.		57,873	20,786	28,524
May		66,370	28,784	25,282
June		64,563	42,165	20,867
July		39,630	58,108	18,394
Aug.		34,199	59,137	17,035
Sept.		29,969	50,264	19,788
Oct.		30,689	43,824	20,795
Nov.		31,930	36,124	20,858
Dec.		33,161	38,456	17,650
Av.		43,774	36,223	23,699

MONTHLY IRON PRODUCTION

Gross Tons

	1935	1934	1933
Jan.	1,476,424	1,225,643	568,785
Feb.		1,270,792	553,067
Mar.		1,625,588	542,013
Apr.		1,736,217	623,606
May		2,057,471	892,326
June		1,936,897	1,264,953
July		1,228,544	1,801,345
Aug.		1,060,187	1,833,265
Sept.		899,075	1,507,931
Oct.		951,353	1,358,540
Nov.		957,906	1,083,740
Dec.		1,028,006	1,192,136
Total		15,977,679	13,221,707

JANUARY IRON PRODUCTION

	No. in blast last day of Jan.	No. in blast last day of Dec.	Total tonnage Merchant	Total tonnage Nonmerchant
Ohio	27	19	47,800	398,330
Penna.	26	17	8,449*	370,015*
Alabama	4	6	36,044	34,170
Illinois	7	5	20,443	107,850
New York	5	4	30,061	59,547
Colorado	1	1		
Indiana	7	5	600	227,211
Maryland	3	3		
Virginia	0	0		
Kentucky	1	1		
Mass.	0	0		
Tennessee	0	0		
Utah	1	1		135,904
West Va.	3	2		
Michigan	4	3		
Minnesota	0	0		
Missouri	0	0		
Total	89	67	143,397*	1,333,027*

*Includes ferro and spiegeleisen.

RATE OF OPERATION

(Relation of Production to Capacity)

	1935[1]	1934[1]	1933[2]	1932[3]
Jan.	34.1	28.3	13.3	22.1
Feb.	.....	32.5	14.3	23.4
Mar.	.....	37.5	12.7	22.0
Apr.	.....	41.4	15.1	20.2
May	.....	47.5	20.9	17.9
June	.....	46.3	30.6	14.7
July	.....	28.4	42.4	13.0
Aug.	.....	24.5	42.8	12.0
Sept.	.....	21.5	36.4	14.0
Oct.	.....	22.1	31.8	14.7
Nov.	.....	22.8	26.2	14.7
Dec.	.....	23.7	27.9	12.5

[1]Based on capacity of 50,975,561 gross tons, Dec. 31, 1933; [2]on capacity of 50,313,975 tons, Dec. 31, 1932; [3]on capacity of 51,598,175 tons. Capacities by American Iron and Steel institute.

tional Tube Co.; Haselton Nos. 2 and 3, Republic Steel Corp.; Ohio No. 4, Carnegie Steel Co.; one Steubenville, Wheeling Steel Corp.; Cleveland No. 1, Otis Steel Co.; River No. 1, Corrigan, McKinney Steel Co.; Youngstown D, Youngstown Sheet & Tube Co. In Pennsylvania: Monongahela No 3. National Tube Co.; Cambria F. and J, Bethlehem Steel Co.; Edgar Thomson H and I, Farrell No. 3, Carnegie Steel Co.; one Eliza and one Aliquippa, Jones & Laughlin Steel Corp.; Shenango No. 1, Shenango Furnace Co. In New York: Lackawanna F, Bethlehem Steel Co. In West Virginia: Riverside, Wheeling Steel Corp. In Kentucky: Ashland, American Rolling Mill Co. In Alabama: Ensley No. 6, Tennessee Coal, Iron & Railroad Co. In Illinois: South Works Old 1 and E, Illinois Steel Co. In Indiana: Gary Nos. 2 and 7, Illinois Steel Co. In Michigan: One Detroit, National Steel Corp.

Furnaces blown out or banked during the month were: In Kentucky: Norton, American Rolling Mill Co. In Alabama: Ensley No. 5 and No. 6 and Fairfield No. 6, Tennessee Coal, Iron & Railroad Co.

ORIGIN OF DECEMBER IMPORTS

Gross Tons

	Pig iron	Manganese ore	Ferromanganese
Belgium	50	.....	20
Canada	284	.....	2,075
British India	3,308	877	.....
Soviet Russia in Europe	.....	2,474	.....
Chile	.....	12	.....
Gold Coast	.....	4,550	.....
France	.....	.....	74
Italy	.....	.....	46
Norway	.....	.....	967
United Kingdom	.....	.....	94
Netherlands	.....	.....	258
Total	3,642	7,413	3,534

	Sheets, skelp and sawplates	Structural steel	Steel bars	Hoops and bands
United Kingdom	7	.....	46	41
Belgium	133	1,438	969	901
Sweden	3	.....	280	1
France	.....	207	1	52
Germany	.....	17	140	38
Austria	.....	.....	4	.....
Czechoslovakia	.....	.....	.....	.....
Total	143	1,662	1,443	1,033

Exports, Imports Less in December

EXPORTS of steel and iron products from United States in December fell 5.5 per cent from those of November and imports were 44.1 per cent less than in November, according to figures of the iron and steel division, department of commerce, Washington.

Exports in December were 282,655 gross tons, compared with 299,263 tons in November, the loss being 16,608 tons. Imports in December were 19,708 gross tons, compared with 35,272 tons is November, a decline of 15,564 tons.

In spite of the net loss in export tonnage, most items showed an increase, the principal exception being scrap, which lost 20,205 gross tons, from 216,566 gross tons in November to 196,361 tons in December. This exceeds the difference between total exports for the two months.

Exports for the entire year, 1934, gained 117 per cent over 1933, export tonnage for 1934 being 2,832,764, compared with 1,350,692 in 1933. Imports declined 23.6 per cent, from 414,790 tons in 1933 to 316,761 tons in 1934.

FOREIGN TRADE OF UNITED STATES IN IRON AND STEEL

Gross Tons

	1934 Imports	1934 Exports	1933 Imports	1933 Exports
Jan.	22,653	178,023	21,892	56,720
Feb.	25,407	151,184	19,748	63,936
Mar.	38,393	261,269	22,114	80,567
April	26,862	201,539	28,061	100,395
May	29,465	241,753	26,295	123,069
June	24,848	219,406	34,368	102,581
July	17,676	233,186	52,805	83,311
Aug.	32,418	242,947	46,839	119,374
Sept.	23,847	301,330	55,706	108,799
Oct.	20,202	220,209	46,673	164,755
Nov.	35,272	299,263	28,979	157,600
Dec.	19,708	282,655	31,310	184,585
Total	316,761	2,832,764	414,790	1,350,692

UNITED STATES IMPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

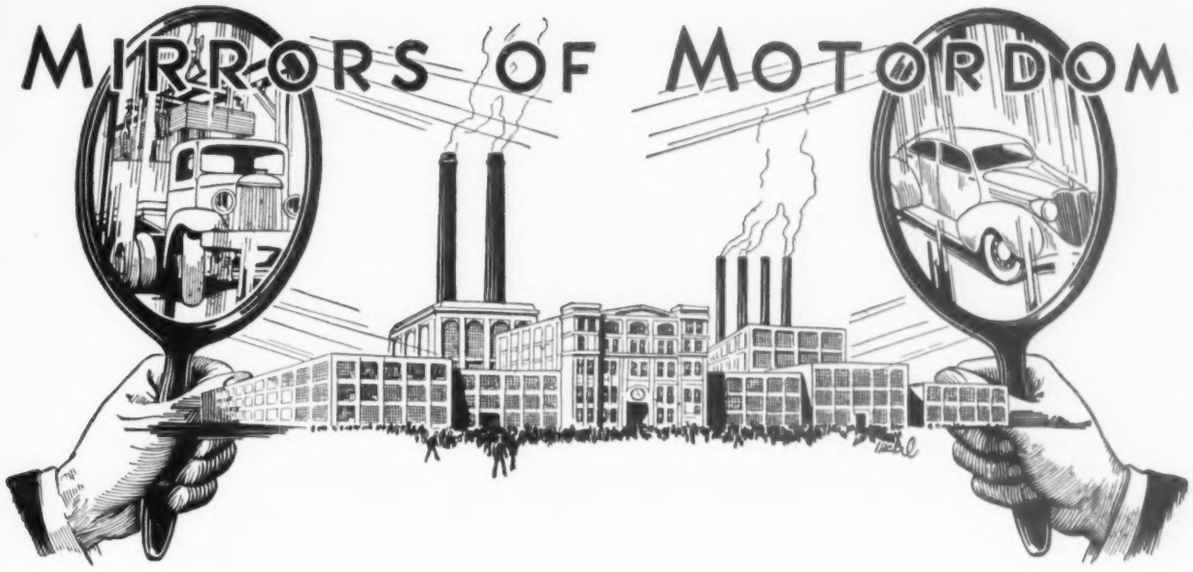
	Dec., 1934	Nov., 1934	12 mos., 1934
Pig iron	3,642	6,055	115,470
Sponge iron	102	.....	898
Ferromanganese and Spiegeleisen (1)	3,534	10,826	39,961
Ferrochrome (2)	.....	.....	74
Ferrosilicon (3)	274	45	993
Other ferroalloys (4)	.....	.....	46
Scrap	4,489	7,606	44,421
Steel ingots, blooms etc.	312	408	2,137
Concrete bars	37	101	1,276
Hollow bar, drill steel	59	43	824
Merchant steel bars	1,443	1,696	18,854
Iron slabs	.....	.....	1
Iron bars	88	15	802
Wire rods	962	880	10,655
Boiler and other plate	38	11	284
Sheets, skelp, saw plate	143	219	4,286
Tin plate	27	2	174
Structural shapes	1,662	3,328	23,913
Sheet piling	.....	.....	1,109
Rails and fastenings	50	305	3,075
Cast iron pipe, fittings	.....	25	65
Welded pipe	74	97	1,740
Other pipe	270	235	3,068
Barbed wire	332	294	8,860
Round iron, steel wire	211	209	2,577
Telegraph, telephone wire	3	1	25
Flat wire, strip steel	180	216	1,805
Wire rope and strand	80	60	1,535
Other wire	52	64	800
Hoops and bands	1,033	1,840	17,858
Nails, tacks, staples	435	488	7,018
Bolts, nuts, rivets	8	29	250
Horse and mule shoes	49	59	428
Castings and forgings	119	115	1,479
Total	19,708	35,272	316,761

(1) Manganese content.
(2) Chrome content.
(3) Silicon content.
(4) Alloy content.

UNITED STATES EXPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

Commodity	Dec., 1934	Nov., 1934	Year, 1934
Pig iron	976	230	4,096
Ferromanganese, spiegeleisen	51	59	195
Iron and steel scrap	196,361	216,566	1,835,554
Ingots, blooms, billets, slabs and sheet bars	1,679	3,627	19,586
Bars, iron	32	144	1,002
Bars, steel	5,538	3,502	42,964
Bars, alloy steel	248	253	2,911
Wire rods	460	3,710	23,734
Boiler plate	100	232	2,157
Other plate, not fabricated	3,787	2,760	34,314
Skelp, iron or steel	428	11,058	74,501
Iron sheets, galv.	209	21	1,424
Steel sheets, galv.	5,659	6,778	67,148
Steel sheets, black	9,471	10,377	90,997
Iron sheets, black	219	263	4,325
Strip steel, cold-rolled	1,781	940	14,169
Hoop, band and scroll iron or steel	1,747	1,087	15,115
Tin, terne plate	17,599	11,831	184,299
Water, oil, gas and other tanks, except lined	1,016	925	7,879
Shapes, not fabricated	2,417	2,462	33,011
Shapes, fabricated	2,330	1,718	18,701
Plates, fabricated	152	318	2,606
Metal lath	90	50	1,110
Frames, sashes and sheet piling	126	17	2,895
Rails, 50 pounds	7,030	2,895	63,505
Rails, under 50 pounds	1,072	52	5,654
Rail fastenings	886	543	10,632
Switches, frogs, crossings	137	201	1,760
Railroad spikes	326	145	3,253
Railroad bolts, nuts	50	40	1,286
Boiler tubes, seamless	665	808	7,787
Boiler tubes, welded	38	77	458
Casing and oil-line pipe, seamless	3,519	1,364	47,059
Casing and oil-line pipe welded	246	246	9,704
Seamless black pipe, other than casing	147	101	3,019
Malleable iron screwed pipe fittings	229	207	2,980
Cast iron screwed pipe fittings	288	93	2,642
Cast iron pressure pipe and fittings	431	724	10,315
Cast iron soil pipe and fittings	1,426	549	4,746
Welded black steel pipe	1,459	1,440	20,165
Welded black wrought iron pipe	207	89	1,573
Welded galv. steel pipe	1,598	1,557	23,664
Welded galv. wrought iron pipe	98	75	833
Riveted iron or steel pipe and fittings	36	69	511
Plain iron or steel wire	1,482	884	15,329
Galvanized wire	1,389	1,150	21,191
Barbed wire	2,680	2,482	36,077
Woven wire fencing	83	88	1,272
Woven wire screen cloth	66	64	965
Wire rope	149	212	2,682
Other wire and mfrs.	338	337	4,700
Wire nails	1,017	1,044	13,201
Horseshoe nails	94	63	786
Tacks	29	46	497
Other nails, staples	259	215	3,654
Bolts, machine screws	533	434	5,141
Iron castings	512	400	6,974
Steel castings	273	181	2,448
Car wheels and axles	1,043	1,195	7,213
Horseshoes	33	3	174
Iron and steel forgings, n. e. s.	361	262	4,221
Total gross tons	282,655	299,263	2,832,764



DETROIT

IN EXTENDING the automobile code from Feb. 1 to June 16 and attempting to regularize employment at automobile plants by moving the introduction of new models forward from late December and early January to the early fall, the President unwittingly may have intensified the seasonal employment problem in the iron, steel and parts industries.

The basis on which automobile manufacturers have been operating wound up their assembly of cars between October and December. Since a minimum of 30 days elapses between the rolling of steel and its final use in assembly, steel and parts manufacture began to ease down from late September to November.

As new models took form in December, steel production began coming back, and in the past two years this influx of automotive demand has been sufficient to tide the iron and steel industry over the hitherto dead spot late in December.

NO HELP TO STEEL SUPPLIERS

In event the government by fiat, through the revised code, can change the buying habits of the public and substitute an early fall showing of new models, the tapering off of the old models will necessarily occur late in the summer, and with steel and parts production at least a month in advance of the assembly line, the big dip in steel production will come in midsummer, intensifying the usual early third quarter lull.

Hence, the first reaction of steel vendors to the proposed new automobile steel setup is that the midsummer dip in steel production will be deepened, and the tonnage normally accruing for new models late in December will be spread over the preceding months, depriving steelmakers of the specifications that have tided them over the year-end. It may well work out for steel and parts makers that while the remainder of the year is on a more level basis, the July and year-end dips will be accentuated.

Labor, consistently in opposition to the proportional representation plan as created by the President himself for the automobile industry, is more disaffected than ever by the extension of the code, but by its own poor showing in recent elections, unable to protest. William Green, head of the A. F. of L., declared Friday in Washington labor would not recognize the new code. Labor, however, can make trouble by guerilla warfare, and tie up "key" departments. This was done at Olds a few hours Thursday by 42 wet sanders at the Fisher Body plant in Lansing. Maintenance men made trouble at Murray Body Friday.

Another vulnerable spot, such as and tool and die division proved a year ago, is plate glass. Organized labor recently has attempted to shut down the principal glass plants catering to automobile body manufacturers, and labor contracts which have ten months to run appear no deterrent to direct action.

As a result of extension of the code in a manner unsatisfactory to labor, Detroit is prepared for guerilla warfare which, by making forays against isolated departments, can be effective enough to completely shut down assembly lines for short periods.

IN THE meantime, automotive assemblies continue at a substantial rate for this period. Final production figures for January are not available but a total of 275,000 to 300,000 units is indicated. February output will be closer to 400,000.

Both Ford and Chevrolet will better their January records materially this month, Chevrolet in particular since master models are just going into production. Reports on retail sales for most cars show an increase over previous years that is comparable with gains made in assemblies.

Ford dealers in some communities will not promise delivery before four to six weeks on new orders, already having heavy backlogs. Ford's output recently totaled 5500 units daily.

SOME BEHIND ON ORDERS

Some manufacturers are keeping abreast of dealers' orders but others who were late in starting production of new models are unable to meet demand promptly. Graham, for example, reports unfilled orders for 3500 cars after shipping 1300 units in January, the best month's business in five years, and expects to boost daily output in February to 300, compared with 100 cars a day recently. Oldsmobile turned out about 12,000 units last month, and

Automobile Production

Passenger Cars and Trucks
U. S. Only
By Department of Commerce

	1932	1933	1934
Jan.	119,344	128,825	156,907
Feb.	117,418	105,447	231,707
Mar.	118,959	115,272	331,263
Apr.	148,326	176,432	354,745
May	184,295	214,411	331,652
June	183,106	249,727	308,065
July	109,143	229,357	266,576
Aug.	90,325	232,855	234,810
Sept.	84,150	191,800	168,171
Oct.	48,702	134,683	132,491
Nov.	59,557	60,683	78,465
Dec.	107,353	80,656	183,187
Year	1,370,678	1,920,057	2,778,739

Estimated by *Cram's Reports*

Week Ended	
Jan. 5	42,003
Jan. 12	59,725
Jan. 19	66,967
Jan. 26	69,409
Feb. 2	73,527

is aiming for 16,000 in February.

Truck sales have been in relatively equal or better volume than passenger car demand lately. Ford's retail orders for trucks the first three weeks of January were the highest for the period in nine years and almost three times as great as a year ago. Chevrolet is bringing out a new sedan delivery truck on the standard chassis, announced as the lowest price enclosed commercial car on the market and intended for handling light merchandise.

Opposition has arisen to the reorganization plan which would end Studebaker's receivership and which would make this company the first automobile builder to emerge from such a financial hospital. While the plan received the approval of the United States district court, certain common stock holders claim they were discriminated against in the program and propose to appeal the case. Studebaker's sales recently have been about 30 per cent heavier than a year ago. Increased schedules are in prospect this month following January's production of about 5500 units.

APPARENTLY pleased with the success of its industrial and educational exhibit at A Century of Progress last summer, Ford is planning a similar display at the California Pacific International exposition to be held at San Diego, Calif., May 29 through Nov. 11.

Ford's exhibit will include a permanent building, an amphitheatre for concerts, and a roadway over which visitors will be driven. Participation in this exposition as well as in the Chicago fair is another indication of the changed attitude which has developed in the Ford company toward merchandising.

RECOGNIZES COMPETITION

When Ford had the lowest price automobile market largely to itself, its car was the company's best advertising medium. At that time about 2,000,000 Model T's were being built annually, and Chevrolet's production was less than 100,000. The changeover to Model A, however, found Chevrolet pressing Ford, and during six of the past eight years General Motors' principal unit forged to the front as the country's leading producer, while Plymouth did exceptionally well to rise from nothing to a strong third.

To lack of appreciation of the value of eye-appeal, advertising and promotional activities, rather than mechanical inferiority of product, Ford's loss of leadership may largely be credited, though it must be admitted that at the same time its principal competitors performed an excellent job in the same respects.

The change in the Ford attitude last year was noticeable when a broad campaign to advertise the performance of V-8 cars was launched. Results, as indicated by a larger percentage gain in sales than that experienced by Chevrolet or Plymouth, were good, and promotional expenditures for this year are expected to be heavier than in 1934.

Nor have these activities been confined solely to direct advertising, bids for good will being evidenced by the appearance of bands and other forms of entertainment at athletic events and other public gatherings "through the courtesy of the Ford Motor Co."

Henry Ford himself probably has received more free publicity than any other industrialist in the country and has capitalized greatly on some of his public utterances and manufacturing methods. His greatest skill, however, has been demonstrated in his ability as a builder rather than as a merchandiser of automobiles. Son Edsel Ford is believed to be the motivating force behind the aggressive movement to intensify sales as well as manufacturing efforts.

STANLEY steamers again may roam the highways—but only in the form of trucks and buses. F. O.

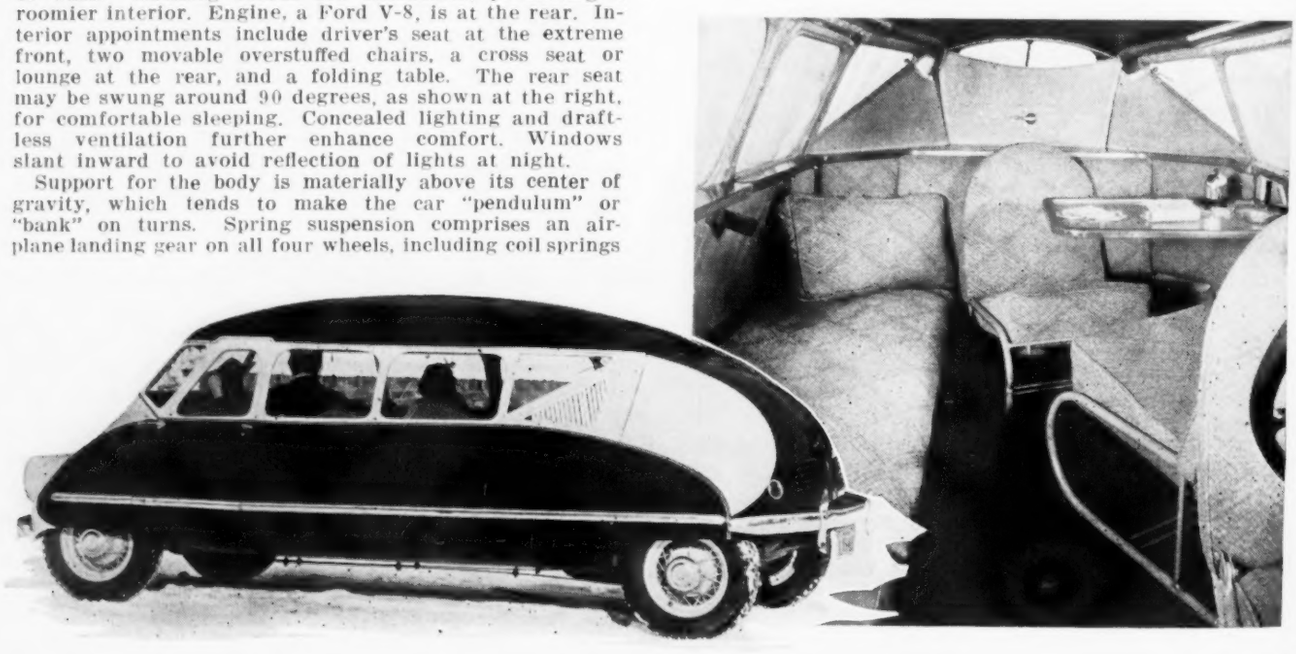
(*Please turn to Page* 91)

Airplane Designer Fathers "Beetle"

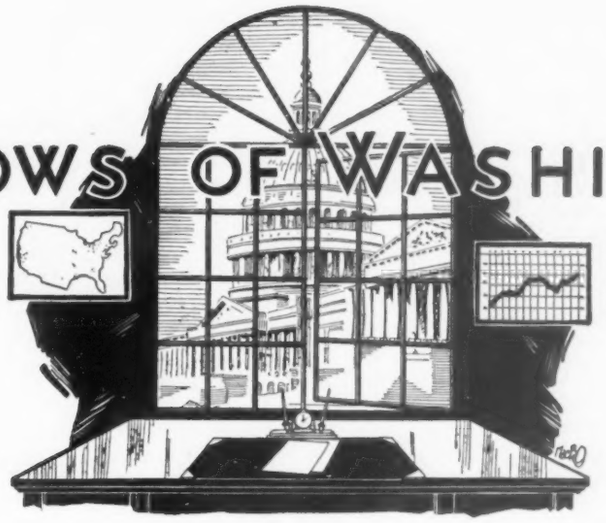
DISCARDS TRADITIONAL DESIGN CONCEPTS: Christened the Stout Scarab because of its resemblance to the "classic Egyptian beetle," this strange craft represents ideas of William B. Stout, president of the Stout Engineering Laboratories, Detroit. Based on airplane design, the body is built up on a frame of alloy steel tube hoops and is shaped to facilitate easier steering in all directions of wind. Running boards are eliminated, permitting a roomier interior. Engine, a Ford V-8, is at the rear. Interior appointments include driver's seat at the extreme front, two movable overstuffed chairs, a cross seat or lounge at the rear, and a folding table. The rear seat may be swung around 90 degrees, as shown at the right, for comfortable sleeping. Concealed lighting and draftless ventilation further enhance comfort. Windows slant inward to avoid reflection of lights at night.

Support for the body is materially above its center of gravity, which tends to make the car "pendulum" or "bank" on turns. Spring suspension comprises an airplane landing gear on all four wheels, including coil springs and large oil cylinders or "oleos" which extend above the axle to a point level with the lower window line.

It is reported a common event during runs of this experimental car for four people to gather about the table for bridge and even to enjoy a light meal while traveling at a speed of 50 miles per hour. It is also to be hoped the driver was no bridge player and was not hungry.



WINDOWS OF WASHINGTON



WASHINGTON

AFTER giving due weight to the fact that Washington always is a changed city when congress is in session, it still is noteworthy that a pall of tenseness blankets it.

For all that congress has been in session a month, and such important issues as social security, the 30-hour week, the Townsend plan, the bonus and unified control of transportation have been edged into the picture, there has been comparatively little discussion and bickering.

The President, congress, industry and organized labor all are engaged in a little quiet sparring, testing their strength and assaying their friends preparatory to the big bout that certainly lies ahead.

Except for Housing Director Moffett, the new dealers are silent. Coordinator Richberg is turning down speaking engagements; the term "brain truster" has practically fallen into disuse; Rexford Tugwell is promulgating no new theories; even PWA Director Ickes is careful of the windmills he chooses for tilting.

SILENCE IS OMINOUS

The whole situation is reminiscent of what someone once termed the thunder of silence. But rest assured, with so many explosive elements lying around loose, a concussion is due.

Labor may be first to blast the silence. Between so-called conservative leaders and the radical element which is chafing at the thought labor may have frittered away its chances under 7a, the breach is widening.

Steel is directly interested in this, because every labor leader in Washington save William Green, head of the American Federation, is whispered as wanting to oust "Mike" Tighe from the presidency of the Amalgamated Association of Iron, Steel and Tin Workers, revive his drooping organization and start something this spring.

Meanwhile, Mr. Green is preparing to stage a real fight for the 30-hour work week bill, which is before both the senate and the house, and this campaign may serve the useful purpose of affording common ground for the right and left wings. In fact, the lid was tilted at last week's hearing on employment provisions of NRA codes; the complacent Mr. Green became a truculent red-faced one in demanding a 30-hour maximum.

It is a genuine phenomenon for congress to say so little when so many big issues are at hand. But it continues to feel its way, albeit it has tasted some blood by forcing minor amendments to the President's work relief appropriation bill, and in the senate by downing the World Court.

THE SAME OLD STORY

The latter upset, however, can easily be exaggerated. A season in the White House seems to imbue every President with a sense of internationalism, while the senate plods along in its traditional nationalism, smiting every executive from Wilson on. The President probably is more worried over the influence of Will Rogers and Father Coughlin, and the manner in which these forces might harass him in the campaign of 1936.

Industry is better represented now in Washington than in many a year, and the strategy seems to be to subordinate the National Association of Manufacturers, the Chamber of Commerce of the United States and the durable goods committee, and cloak individuals with the mantle of leadership.

If any one individual can be said to represent industry at this time it is Ralph E. Flanders, of the Jones & Lamson Machine Co., Springfield, Vt., who bare handed took on the David of organized labor — Sidney Hillman—at the NRA labor hearing last week and won, at least on points, a heckling argument over the 30-hour week and the profit system.

Steel refuses to abandon its traditional opposition to being represented in Washington and enable Washington correspondents to present both sides of questions affecting it, but some effort may be made to humanize the industry and submit some of its leaders to occasional questioning by the press.

Not the least of the four facets to the Washington situation—congress, the President, industry and labor—is the President himself. Those who have seen him recently remark on his increasing seriousness.

It is only recording fact to say that those representatives of iron and steel in Washington who have contacted him and his advisers the closest and who have followed events at first hand are disposed to be less critical of him and more cooperative. They reason thus:

The President is realizing that his record is going to be interpreted in 1936 in terms of reduction of unemployment. After almost two years in office, and with the national debt upped eleven billions, unemployment has not been materially lessened. Brushing aside a congenital dislike for business, he appreciates now that he must work with it.

A GUARD AGAINST LEFTISTS

More than is publicly known, he has given assurances to business. Short of shouting it from the house tops — which would only alienate much mildly radical support he so badly needs — he has certified to business that he will stand between it and extreme left wing proposals, that the dollar will stay at 59 cents, that if industry is to be spared a statutory 30-hour week only he can check it.

The danger of repeating 1932 is more pregnant than the country is aware. An executive a little to the left of the center is preferable to one away out at the left, or perhaps one away over to the right. An overturn in the 1936 election would result in a hiatus, such as developed from the

defeat of Hoover to the inauguration of Roosevelt — a situation that might set recovery back two years.

Fallacious, defeatism, deathbed repentance — whatever you call it, nevertheless it is the sentiment voiced by some who for two years have not spared epithet. Perhaps it represents compassion for a man with a staggering burden, or an innate desire to think constructively breaking through the midst of destructive criticism.

WHEN Co-ordinator Eastman sent his voluminous report on transportation and nine separate bills to congress Thursday he voluntarily stepped into a pretty fight. At the outset, 8 of the 11 members of the interstate commerce commission are flatly antagonistic — which is quite a handicap.

Briefly, Mr. Eastman proposes an ICC of 16 members — a railroad division of five, a finance division of three, a water carrier and pipe line division of three, a motor carrier and air carrier division of three, a co-ordinator and a general chairman appointed by the President.

The general chairman, who probably would be a political appointee, and the chairmen of each division would constitute a control board and, as the opposition maintains, might actually become the commission. The remaining members would have a status little higher than that of examiners.

FOR GENERAL HOUSECLEANING

In addition to this reorganization of the present ICC and a unification of control over all transportation, Mr. Eastman would eliminate duplicate services (substituting his own for the so-called Prince plan), regulate pipe lines and buses, provide for dismissal wages for railroad employes, and in general overhaul the transportation setup of the country.

Probably not even Mr. Eastman himself has hopes of getting all nine bills through. On the other hand, an omnibus bill might have gone down to defeat. For steel it is important to note that pipe lines are marked for regulation. Last week the ICC began an evaluation at Houston, Tex., with 11 special engineers. There are 93,000 miles of pipe line, and heavier taxation may be one objective.

Steel, incidentally, is greatly interested in Mr. Eastman's leaning toward light freight equipment and shorter and more frequent service to compete with trucks on short hauls. The railroads have been striving for years at the 100-car train as a means of reducing the labor cost, and cars have been built heavy purposely to stand the strain of handling. Short trains call for light cars and less steel.

Last week the senate acted favorably on shifting from PWA to RFC the power to loan to the railroads for purchasing equipment. While the RFC has been under suspicion in some quarters because Hoover founded it, there is less love in other quarters for PWA Director Ickes. RFC is empowered to loan up to $350,000,000 and to take back equipment trust certificates on more favorable terms than other obligations, because the former would be secured by equipment. As yet, a definite railroad program has not been shaped up.

THE critics who predict the passing of Housing Director Moffett and the merging of his housing administration with some other new deal agency have strong backing, but a fair verdict on this recovery agency cannot be turned in before midsummer.

Starting in the fall, the season has been against both repairs and new construction. Other new deal sure things for recovery have not supplied the expected reinforcement, for labor manifestly cannot be expected to build or buy houses without greater certainty of employment.

VARIED DESIGNS PROPOSED

Regardless of the difficulties encountered by Mr. Moffett, whose resignation would give opponents of business men in government something to crow over, the steel interests which have been active in devising light framework and interior sections are not letting up. The man who proposes building in the spring will have a variety to choose from.

As the department of commerce is pointing out, women may have to temper their individuality to stand designs for steelframe houses. For example, the new pressed steel sections are designed for certain spacing, say 12 to 24 inches, and a kitchen would have to be laid out in terms of these units and not according to an odd inch or two. Likewise, at the outset, there will be standard interior designs, but any desired exterior treatment will be possible.

As the housing situation is explored, it is being realized that the so-called laboring man is really the attractive market. Hitherto, labor has moved into houses offered by the salaried classes as the latter moved into new districts or the suburbs. But the past few years this migration has ceased, and the new type of housing is designed for labor. Rarely before has any housing been specifically erected for labor.

Incidentally, the steelframe houses which a large steel company will erect shortly in a suburb of Washington with a great fanfare will go on a tract at Roosevelt and Jefferson streets. The choice was unintentional, but the names ought to be auspicious in a Democratic administration.

Died:

PAUL WILLIS, 71, former president of the Kenwood Bridge Co., Chicago, at his home in that city, Jan. 30. With F. W. Barker, he organized the Kenwood Bridge Co. in 1890, being secretary and engineer until 1908 and president from 1910 until the company was absorbed in 1925 by the McClintic-Marshall Corp. Mr. Willis was vice president of McClintic-Marshall from 1924 until his retirement in 1931.

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Harlie A. Mason, secretary and sales manager of the Columbus Bolt Works Co., Columbus, O., Jan. 16.

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Joseph F. Shultz, 36, master mechanic at Alabama ore mines of the Republic Steel Corp. at his home, near Birmingham, Ala.

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Jacob W. Boerner, 66, formerly superintendent of the Ames Shovel & Tool Co., Anderson, Ind., in that city recently.

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Niles Nyberg, 82, part owner of Union Iron Works, Minneapolis, in that city, Jan. 9. He established the company 60 years ago and was active in the business until 1920.

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William G. Spence, 82, retired industrialist and real estate operator, in Milwaukee, Jan. 19. He was a former vice president of the Rundle-Spence Mfg. Co., manufacturer of plumbing goods.

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David H. Buxton, 74, founder and chairman of the board of Globe Machinery & Supply Co., Des Moines, Iowa, in that city, Jan. 12. He retired from the presidency of the company in 1925.

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James E. Higgins, formerly superintendent of the Whitcomb Foundry and for over 10 years New England salesman for the Reed-Prentice Corp., Worcester, Mass., Jan. 14. He was a World war veteran and for the last three years had been adjutant of the 181st infantry of the Massachusetts national guard.

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R. W. Light, 48, for eight years in the sales office at Detroit of Jones & Laughlin Steel Corp., in Detroit, Jan. 24, as noted in STEEL for Jan. 28. He was a graduate of Carnegie Institute of Technology and had been in the employ of Carnegie Steel Co. at Clairton, Pa.; Bethlehem Steel Co. at Johnstown, Pa.; Crucible Steel Co. of America at Midland, Pa.; and Jones & Laughlin for the past 12 years.

Industrial Men in the Day's News

H A. FENNERTY has been elected vice president and assistant treasurer of the Alliance Machine Co., Alliance, O. He has been with the company for the past six years in the shop and engineering departments, in his new position succeeding J. C. Hoot.

R. J. Harry, associated with the Alliance company for five years and before that active with Carnegie Steel Co. for 22 years, has been named general manager. While with Carnegie, he was assistant superintendent of the electrical department at the Homestead, Pa., works.

R. R. Stuckey, active with Alliance Machine for 20 years and recently assistant manager of production, has been appointed production engineer.

R. E. Purcell has been elected to fill a vacancy on the Alliance board of directors.

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Clifford S. Stilwell has been elected a vice president of Warner & Swasey Co., Cleveland. He has been associated with the company for 23 years, since 1930 as sales manager.

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Walter E. Hadley, for the past 17 years assistant general superintendent of the Gary, Ind., works of Illinois Steel Co., Chicago, has been made general superintendent, effective Feb. 12. He succeeds William P. Gleason, who is retiring on his seventieth birthday. Mr. Gleason was superintendent of construction of the plant starting in 1906, and has been in charge of its operations since that time.

Walter E. Hadley

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John L. Campbell has been appointed manager of roll sales for the Ohio Steel Foundry Co., Lima, O. He has been active in roll sales since July, 1933, having formerly been associated with the Hubbard division of Continental Roll & Steel Foundry Co. In his new position he will have charge of sales of steel, alloy steel and iron rolls manufactured at Lima and Springfield, O., plants of the company.

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Carl G. de Laval was appointed sales representative of Electro Metallurgical Sales Corp. in the Pittsburgh district, effective Feb. 1. Since 1925, he has been with the production department of the company at its Niagara Falls, N. Y., plant.

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A. H. Skaer, formerly associated with the Denver Rock Drill Mfg. Co., Denver, for many years as president, has been appointed to take charge of the Cochise Rock Drill Mfg. Co., Los Angeles, subsidiary of the Independent Pneumatic Tool Co., Chicago.

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W. J. McDonough has been appointed sales manager of the Northern Equipment Co., Erie, Pa. He has been associated with the organization since 1922.

Thomas A. Read has rejoined the engineering department of the company, where he was active from 1928 to 1933. He will devote his efforts to expansion of the research and development program now under way.

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William Zorn, welding engineer for the Detroit Edison Co., Detroit, has become consultant welding engineer for the C. H. Dockson Co., Detroit, Feb. 1. Companies with which he has previously been asso-

John H. Vohr, Superintendent, New Hot Strip Mill, Youngstown Sheet & Tube Co.

Following graduation from college he enlisted in the army service as a commissioned pilot in aviation.

His steelmaking activities have been centered in mills at Farrell, Pa., Gary and Indiana Harbor, Ind.

His experience in building and operating strip mills led him to supervising the new mill at Youngstown.

JOHN H. VOHR who as noted in STEEL for Jan. 14 has been named superintendent of the new hot strip mill of Youngstown Sheet & Tube Co., Youngstown, O., shortly to be placed in operation, was born and raised in Pittsburgh, later attending Cornell university.

Following graduation, he enlisted in the army as a commissioned pilot in the aviation section, spending considerable time in charge of instruction of student pilots.

He entered the field of steelmaking as engineer in charge of construction at the American Sheet & Tin Plate Co. mill at Farrell, Pa., later becoming master mechanic. After 12 years he was transferred to the company's Gary, Ind., plant, where he became assistant superintendent of the strip mill.

Some years afterward he went with the Inland Steel Co., Indiana Harbor, Ind., and was appointed assistant superintendent of the wide strip mill there.

With this broad background of experience in rolling strip steel, he was ideally suited to supervise construction of Sheet & Tube's new mill several months ago, and now will be superintendent when the mill begins production.

ciated include Steere Engineering Co., Owosso, Mich.; Hydraulic Pressed Steel Co., Cleveland; New York Central railroad and Baltimore & Ohio railroad. Author of a number of technical papers on the subject of welding, he was one of the prize winners in the recent annual prize contest of Lincoln Electric Co.

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F. L. Greene, vice president of General Refractories Co., Philadelphia, has been named a director.

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V. C. Doerschuk has been appointed general superintendent of the reduction division of Aluminum Co. of America at Massena, N. Y.

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D. L. Orton, sales engineer at the headquarters of the Clark Controller Co., Cleveland, has been transferred to the company's district office at Chicago as sales and engineering representative.

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E. W. Bixby, formerly sales manager for the Columbian Iron Works, Chattanooga, Tenn., has been placed in charge of a new sales office at Memphis, Tenn., of the Pittsburgh Equitable Meter Co., and its subsidiary, Merco Nordstrom Valve Co.

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Roger D. Edwards, former president of the Stimpson Corp., Louisville, Ky., and associated in an official capacity with the Ryan Car Co., Chicago, has been voted president of Atlas Tack Corp., New York, succeeding Walter Kilvert, recently resigned.

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A. P. Munning, member of the board of directors of Hanson-Van Winkle-Munning Co., Matawan, N. J., who retired in March, 1930, again has become actively associated with the business in an executive capacity. No change in the officers or directors of the company has been made.

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Frank L. Campbell has been appointed general sales manager of the O. Hommel Co., Pittsburgh, chemicals and paints. Past associations include John Lucas & Co., Chicago; Beaver Board Companies, Buffalo; United States Chain & Forging Co., Pittsburgh; Congoleum-Nairn Co., Chicago; and the Masonite Corp., Chicago.

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A. O. Stark has been appointed sales manager of the Universal Atlas Cement Co., New York, subsidiary of the United States Steel Corp., succeeding the late N. A. Kelly. Mr. Stark came to Universal Atlas in 1908 and served successively as clerk in the New York city sales department, clerk in general sales and assistant district sales manager. In 1913 he became export manager and assistant sales manager.

W. R. Heckendorn, former Boston district sales manager, becomes assistant sales manager at New York. He has been associated with the company since 1923.

H. F. Van Wagner, Newark, N. J., district sales manager, has been transferred to Boston in the same capacity.

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Dr. Lillian M. Gilbreth, consulting engineer in management, has been appointed professor of management at Purdue university, Lafayette, Ind., effective Sept. 1. A recognized leader in the field of management, she is the widow of Frank B. Gilbreth, himself a pioneer in the application of scientific management to industrial operations.

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E. B. Abbett has been re-elected for his sixth term as president of GOHI Culvert Manufacturers Inc., Cincinnati. He is also president of the National Corrugated Rolled Metal Culvert association and chairman of the code authority for that industry. He is general manager of the Newport Culvert Co., Newport, Ky.

E. B. Abbett

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E. L. Bates, associated with Borton & Co., Cleveland, is the new vice president of Fostoria Pressed Steel Co., Fostoria, O. He has been a director of the latter interest for several years, and succeeds E. W. Allen.

C. D. Pifer, president and general manager, and R. J. Carter, secretary-treasurer, have been re-elected to their respective posts.

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Frank F. Simon, chief cost accountant of Wagner Electric Corp., St. Louis, has been appointed controller of the company. He also will assume the duties of the late G. L. Evans, vice president.

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Edgar M. Queeny, president of Monsanto Chemical Works, St. Louis, has been elected a member of the board of directors of National Bearing Metals Corp., succeeding the late Samuel F. Pryor.

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J. D. Landis, assistant to the president, Reading Co., Philadelphia, retired Feb. 1, following many years affiliation with the company.

Samuel R. Sickel and Charles N. Linson have been appointed assistant purchasing agents for Reading.

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Edgar C. Bain has been appointed assistant to the vice president in charge of metallurgy and research of the United States Steel Corp., 71 Broadway, New York. He formerly was affiliated with the Steel corporation's central research laboratories at Kearny, N. J.

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Carl W. Fenninger, vice president of the Providence Trust Co., Philadelphia, has been elected a director of the York Ice Machinery Corp., York, Pa.

E. A. Kleinschmidt has been made vice president in charge of finances. He was formerly secretary and treasurer.

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John Malloy, of Malloy & Schreiner, has been elected president of the Ferro club, Philadelphia, social organization of iron and steel scrap dealers and brokers.

Thomas Cantivoglio, Camden Iron & Metals Co., Camden, N. J., has been named vice president; Norman Perez, Martin Co., secretary; and Harry Stave, treasurer.

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Adolph J. Bihler, president and treasurer of James C. Lindsay Hardware Co., Pittsburgh, and for 19 years a member of the advisory committee of the National Wholesale Hardware association, has been awarded the 1935 gold medal and scroll of the association, presented annually to an outstanding individual in the hardware industry.

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Philip P. Edwards has been named vice president of Kearney & Trecker Corp., Milwaukee, following his resignation as vice president of the First Wisconsin National bank of Milwaukee. In his new work he will assume charge of certain phases of the business formerly under direction of the late E. J. Kearney, who until his death was secretary and treasurer.

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Ralph H. Clore, formerly general sales manager of the United States Electrical Tool Co., Cincinnati, since Feb. 1 has been general sales manager of the Medart Co., St. Louis, manufacturer of power transmission machinery, succeeding F. P. Kohlbry who has resigned to assume active direction of the Machinery & Welder Corp., Chicago.

EDITORIAL

More House Per Dollar Is Key to Building Problem

ALMOST every commentator on the progress of industrial recovery in Great Britain refers to the important part played by the construction of low priced homes. Invariably the British steel industry is linked with this development; in fact, it is stated that home building has been an influential factor in the gratifying improvement in steel demand during the past 18 months.

Henry J. Allen, former governor of Kansas, writing in the *New York Herald Tribune*, reports a 40 per cent gain in the building trades last year. He relates how he inspected a model house in Glasgow, made of fabricated steel and having a parlor, dining room and kitchenette on the ground floor and a bath and three bedrooms above. It had panel electric fires for the bedrooms and steel fireplaces for all the house. Much of the furniture was of steel. The agent who guided Mr. Allen through this house, offered to sell it for £600 ($3450). A down payment of only $250 would be required.

Mr. Allen reports that in 1934 private enterprise erected and sold 3260 new houses in Glasgow and that in the same period the municipality provided more than 3500 new dwelling places of less expensive construction.

Failure To Stimulate Revival of Building Should Suggest That Method Is Wrong

Glasgow has a population of slightly more than a million. No city in the United States of comparable size enjoyed a revival in building in 1934 even remotely approaching that of the metropolis of Scotland. This disparity, which is typical in many comparisons of building progress in this country and abroad, should spur the building interests of the United States to renewed efforts to determine what is wrong with American methods.

Why is it that with well manned agencies in Washington, supported with the power of the government and with large sums of money at their disposal, and with a strong building industry eager to get started, our national drives for the revival of home building make so little progress?

The answer to this question is very important to the broad problem of national recovery. No branch of activity in the country has stood out against the pressure of recovery drives so stubbornly. In no industry is the rate of unemployment higher. Building activity has been a consistent laggard from the very beginning of concerted recovery effort, and yet improvement in the building field would go further in solving many of the difficulties of the present than dozens of the expedients now being tried.

Friends from overseas, who have the advantage of examining our problems from a broad perspective, seem to think that failure in the United States to break the deadlock in building activity is due to two factors. First is high prices of labor and material; second is the high rate of interest for long term credit.

Many persons in the United States hold similar views. Perhaps it is significant that within the past fortnight a national weekly magazine and a chain of daily newspapers, both of which have supported most of the new deal policies enthusiastically, came out with strong editorials favoring lower wages—at least, temporarily—as a means of forcing building activity off dead center.

Put Home Construction on Efficient Basis in Manufacture, Assembly and Financing!

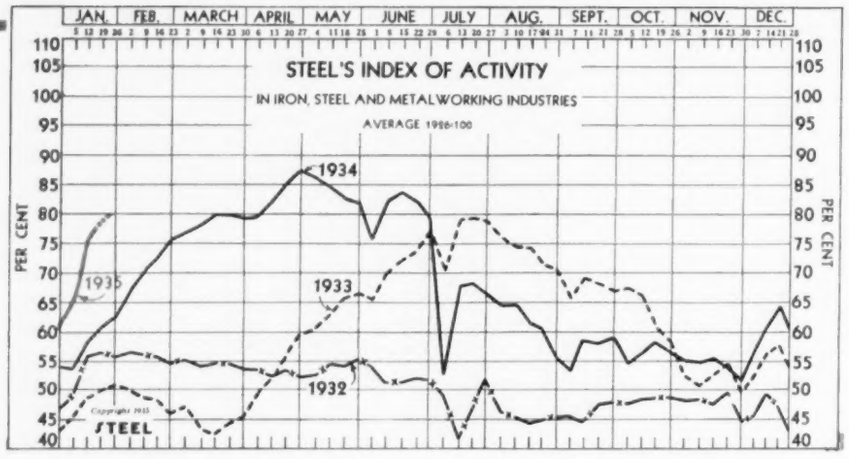
Against the growing conviction that pegged high unit wages and maximum hours are obstacles to recovery is the constant pleading of Mr. Green of A. F. of L. for still higher hourly rates and a 30-hour week. He is edging out to the end of a limb that will have to be cut off before real improvement in building can be expected.

There are special reasons, peculiar to the United States, why every item of unnecessary expense should be trimmed from the cost of building homes. The average American family has learned that it can obtain so much more value per dollar from an automobile, electric refrigerator or other article manufactured efficiently that it prefers to spend its money for them instead of for a home. Thousands who live in inadequate and unsatisfactory quarters own motor cars and other like conveniences.

When, by virtue of efficient manufacture and common-sense financing, industry can offer to the public homes which afford the high values per dollar which now are enjoyed in the purchase of automobiles—then the demand for residences will exceed the supply.

When this time comes, it will be found that steel is one of the principal materials which lends itself to low cost manufacture, and that the building industry will threaten the automobile industry as the principal consumer of steel.

THE BUSINESS TREND



STEEL'S *index of activity in the iron, steel and metalworking industries gained* 1.5 *points to* 79.6 *in the week ending Jan.* 26:

Week ending	1934	1933	1932	1931
Dec. 8	56.8	52.6	46.6	52.9
Dec. 15	60.6	56.0	49.3	53.1
Dec. 22	64.4	58.0	46.9	52.3
Dec. 29	60.8	53.7	42.9	46.8
	1935	1934	1933	1932
Jan. 5	65.4	53.6	45.3	48.8
Jan. 12	73.8	58.1	48.6	55.8
Jan. 19	78.1	60.9	49.8	56.2
Jan. 26	79.6*	62.3	50.8	55.8

*Preliminary.

Volume Gains as Industry Enters Second Month

INDUSTRIAL activity maintained a vigorous stride throughout January, and entered the second month with only minor indications that its pace may be slackened appreciably. Ordinarily, when the curve of business rises sharply from the year-end holidays, it begins to flatten out before the end of January.

This year was no exception to this rule. However, the upward spurt in the first three weeks of January was more vigorous than in any comparable period during the depression. Moreover the tendency for the curve to flatten out in the late weeks of the month was much less pronounced.

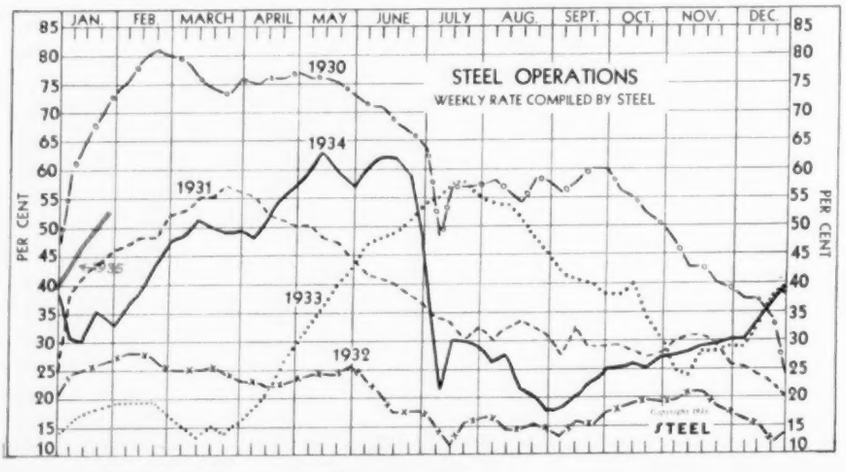
Steelworks operations continue to rise several points weekly. Starting the new year at around 42 per cent, the rate advanced steadily throughout the month and entered February at about 56 per cent of capacity. Automobile output, which was averaging 40,000 cars a week at the turn of the year, was above 75,000 units a week at the end of January. Electric power output, which has been hovering around pre-depression levels for about two months, touched 1,781,700,000 kilowatts hours in the week ending Jan. 26. Except for the output in the week before last Christmas, this is the highest figure since 1930.

According to preliminary figures, freight car loadings in the week ending Jan. 26 were off slightly from the previous week. This relapse is attributed partly to severe weather in many sections of the country.

Railroads' Share of Benefits of Automobile Activity Is Restricted by Truck Rivalry

Another explanation is that freight traffic has not benefited proportionately with other activities in the present expansion of activity in the automobile industry. Much of the material going to auto plants for manufacture is hauled by truck, and an increasing number of finished cars go to destination via the highways, instead of in railroad cars. This is one reason why freight car loadings are not an accurate barometer of industrial activity.

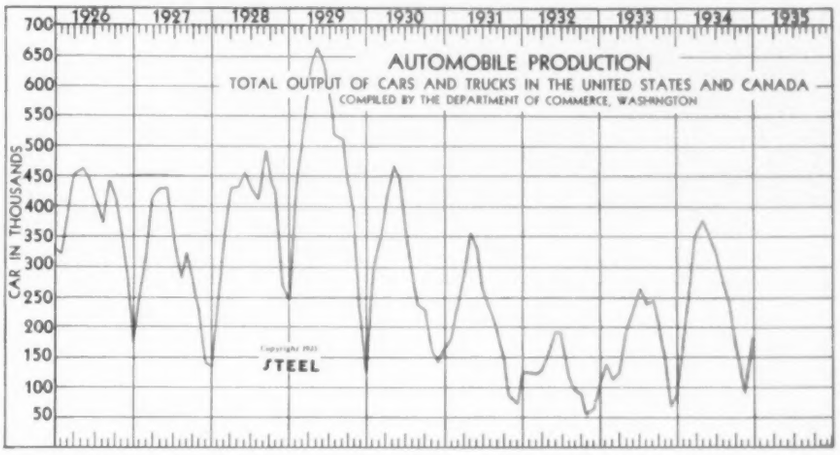
1935	Per Cent
Jan. 26	53
Jan. 19	51
Jan. 12	45½
Jan. 5	42½
1934	
Dec. 29	39
Dec. 22	37½
Dec. 15	33½
Dec. 8	30
Dec. 1	28
Nov. 24	29
Nov. 17	28
Nov. 10	27½
Nov. 3	27
Oct. 27	25½
Oct. 20	26½



1934	Per Cent
Jan. 27	33
Jan. 20	35
Jan. 13	30
Jan. 6	31
1933	
Dec. 30	36
Dec. 23	38
Dec. 16	33
Dec. 9	29
Dec. 2	29
Nov. 25	28½
Nov. 18	28
Nov. 11	24
Nov. 4	25
Oct. 28	30
Oct. 21	34

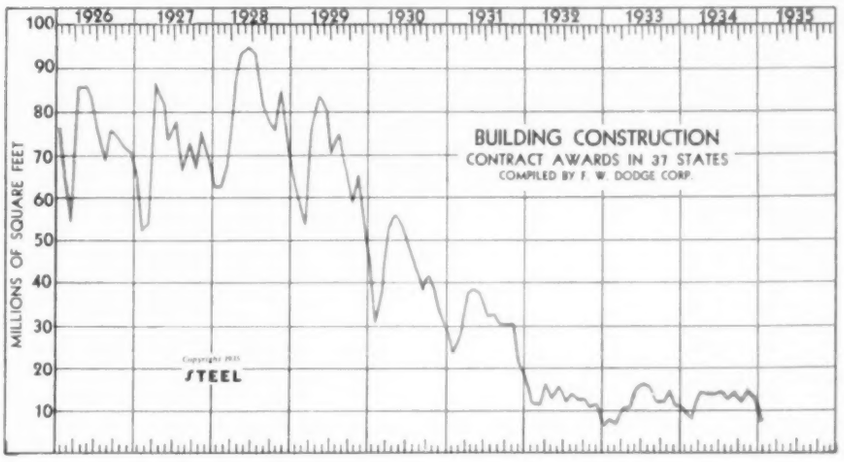
Automobile Output Expands Rapidly

	1934	1933
January	163,811	132,836
February	240,278	109,231
March	345,443	122,617
April	373,108	185,314
May	351,813	224,228
June	321,970	257,613
July	277,690	236,680
August	244,714	239,904
September	174,450	198,421
October	136,271	138,638
November	80,162	63,322
December	185,919	84,376



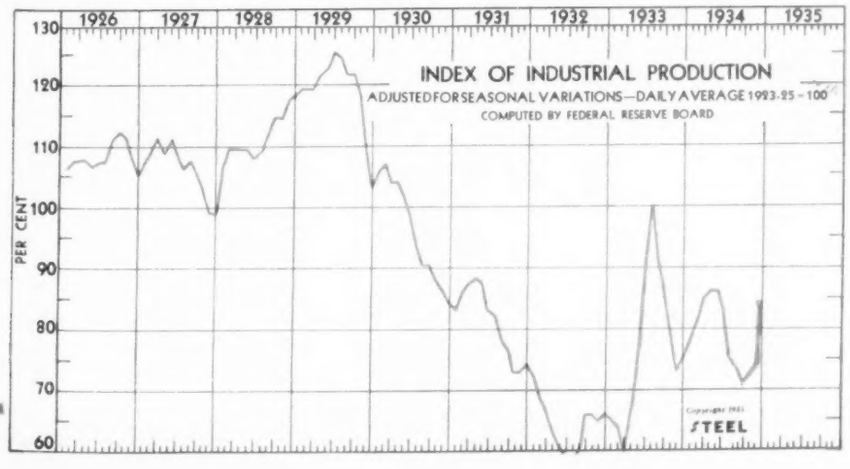
Building Construction Lags as Year Ends

1934	Square Feet
Jan.	9,568,700
Feb.	8,176,300
Mar.	14,788,900
Apr.	14,207,100
May	14,664,400
June	13,986,500
July	13,250,000
Aug.	14,259,000
Sept.	12,510,300
Oct.	15,098,100
Nov.	12,780,800
Dec.	9,193,300

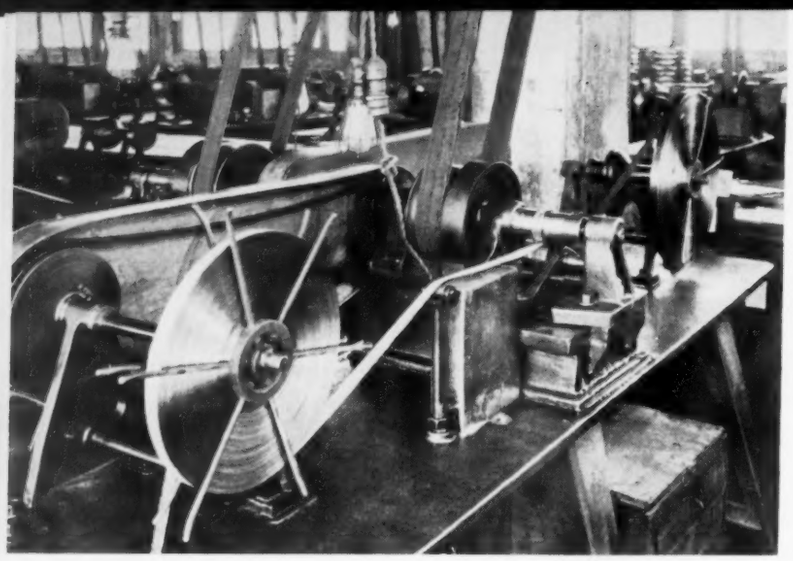


1933	Square Feet
Jan.	8,453,000
Feb.	7,382,400
Mar.	9,890,200
Apr.	10,870,400
May	12,295,700
June	16,075,400
July	14,605,600
Aug.	13,002,200
Sept.	12,867,400
Oct.	15,534,700
Nov.	11,762,300
Dec.	11,451,500

Industrial Production Up 11 points in December



	1934	1933
January	78	65
February	81	64
March	85	60
April	86	67
May	86	77
June	83	91
July	75	100
August	73	91
September	71	84
October	73	77
November	74	73
December	85	75



PERFORATING coiled steel strip, 1768 perforations to the square inch, with stock 0.800 and 0.940-inch wide and 0.003 and 0.005-inch thick. Following this operation, delicate grinding is required to remove burrs

Fabrication of In Elements Storage

BY L. E. BROWNE
Associate Editor, STEEL

INCREASED use of steel in the manufacture of electric storage batteries has been accompanied by the development of special machinery, mostly automatic in operation, for intricate fabrication and mass production. A pioneer in the manufacture of steel batteries has been the Edison Storage Battery division, Thomas A. Edison Inc., West Orange, N. J., producing electric storage units, which by weight are 98 per cent metal, at least 82 per cent being low-carbon steel.

With the exception of a few screw, milling and stamping operations on standard parts, special tools, dies, automatic controls and jigs have been designed by the Edison Battery division. Many of the most intricate were designed by Thomas A. Edison himself and one process, developed by Mr. Edison, that of the manufacture of pure nickel flakes for filling the positive tubes of the battery cell, is most unusual. Research in bringing the manufacture of nickel-iron-alkaline batteries by the Edison organization to the present point of perfection, with steel as the basic material in their construction, rivals that devoted to any of the developments of the Edison laboratories, with the possible exception of the electric lamp.

Summary of Requirements

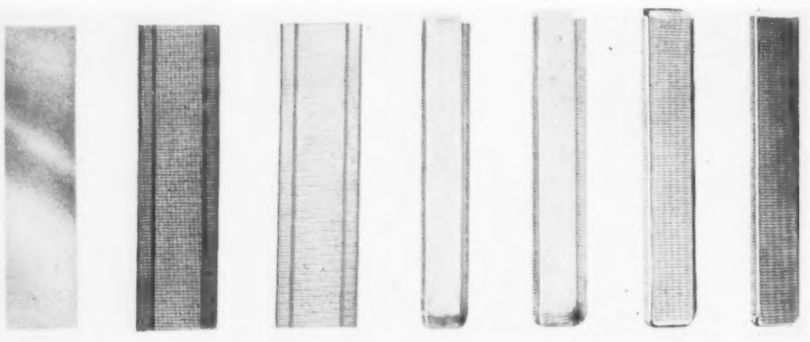
Annually 1500 tons of hot-rolled low-carbon steel sheets and strip are required. The strip is cold-rolled on a Steckel-type mill with an automatic control and other refinements. Machined parts account for 750 tons of low-carbon bar stock annually. For the positive tube cells 300 tons of nickel are refined into pure flake nickel. For the iron oxide to fill steel "pockets," making up the negative cells, 375 tons of high-grade Swedish iron is consumed annually. All steel parts are nickel plated with automatic equipment. There are 1534 such parts in a standard cell. All nickel-plated material also is annealed.

While to the layman the nickel-flaking process probably is the most fascinating, to the steel fabricator, the path followed by the steel from the cold-rolling mill to the final operation is most interesting. In the fabrication of tubes and pockets, holding the active materials in the cells or plates, hot-rolled strip 7 inches wide and 0.107-inch thick is cold-rolled on a one-stand automatic mill to a thickness of 0.003-inch for pocket material and 0.005-inch for tube stock.

This mill has an automatic gager, a small notched wheel emerging from a steel box at the side of the unit under constant observation of the operator. This delicate gage is stationary until the tolerance of the steel leaving the reduction roll varies. The automatic gage registers within 0.0001-inch of the required thickness and when the material being rolled shows the slightest variation, the wheel moves to the right or left. One full turn of the control wheel registers 0.001-inch and the tolerance is adjusted readily by the operator. Subsequent fabrication requiring absolute tight joints in the assembled battery cells calls for close tolerances, although the battery interior has no moving parts.

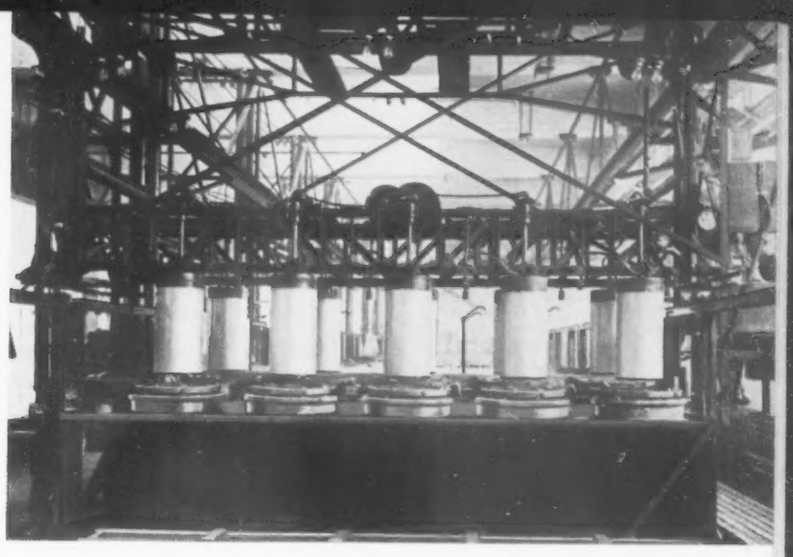
The thinnest stock later must be twisted, folded and lap-jointed and close inspection from re-rolling mill to finished tube or pocket is maintained. Previous to the installation of this mill 15 stands were required for the necessary re-rolling operations on older equipment.

The cold strip is slit into ribbons 0.800 and 0.940-inch wide with stock



Evolution of the negative pocket from cold-rolled strip at the left to the loaded pocket at the right. Steps include perforation, nickel plating, folding into form with one end open for loading, and loading

Steel for Use of Alkaline Batteries



BATTERY of ten revolving cylinders, lowered into tanks alternately containing nickel, copper and water, thereby being plated with layers of nickel and copper. This is the first step in obtaining nickel flake

0.003 and 0.005-inch thick. The steel ribbons then pass between two perforating rollers, one with small projections on the surface, the other with corresponding depressions. Here 1768 perforations to the square inch are made. For the removal of possible burrs, the ribbon is ground automatically by emery wheels, smoothing the rough side, a delicate grinding operation considering the thin stock. Perforations in both the positive tubes and negative plates are necessary to enable the potash solution in the battery to contact the pure nickel hydrate and iron oxide and bring about the required chemical action for electrical energy. In perforating the strip for the negative pocket, a narrow portion of the ribbon on each side is left with a smooth surface, the perforations being in the center, but covering well over half of the ribbon.

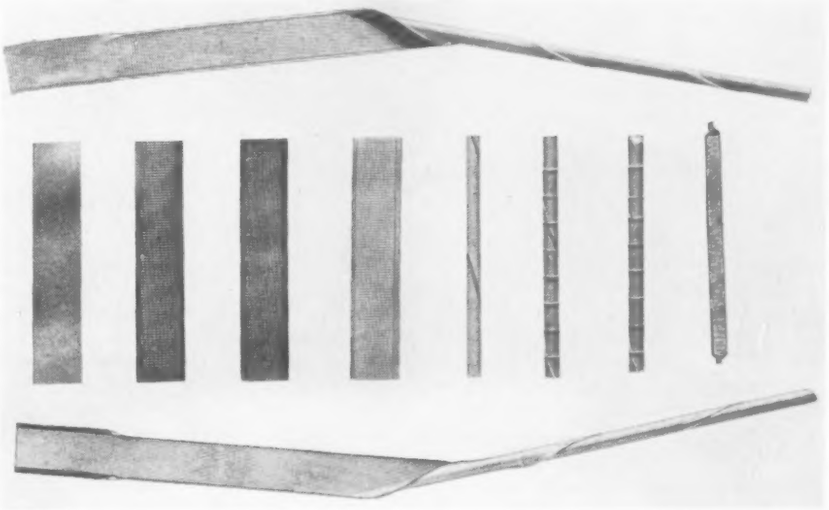
Cleaned by Brushes

In the burr grinding operation, however, emery dust fills, or partially clogs the small perforations. The ribbon therefore is automatically fed through a machine and cleaned by six revolving brushes, two contacting one side of the perforated material, two the other side while two move across the surface. The strip zigzagging up and down through the machine emerges with each perforation cleaned of dust and other foreign material.

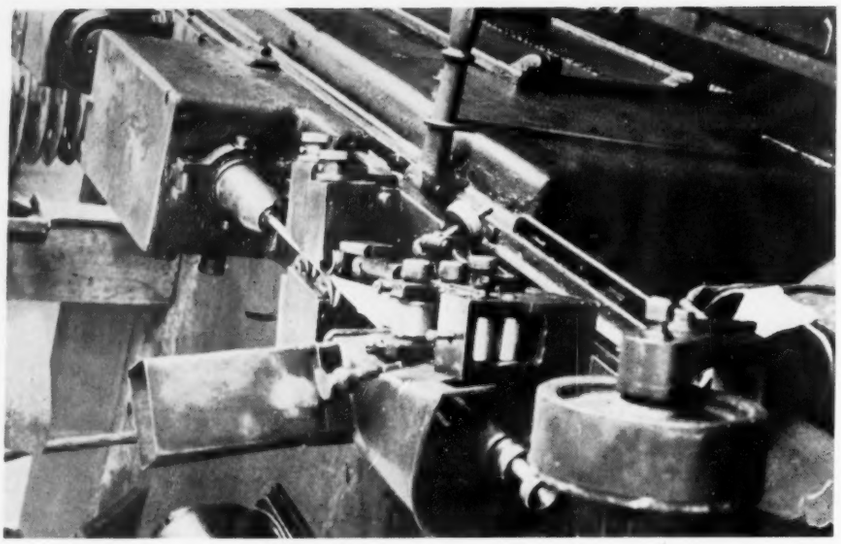
The strip is then nickel plated. Again the operation is largely automatic, only one man being required to place the heavier work on the loading arms. In the case of strip, however, the ribbon is drawn from a reel, traveling through a series of rubber-lined steel tanks. The transfer arms of the equipment for heavier material are moved and timed automatically. The tanks contained potash solution, hot water, double solution of nickel ammonium sulphate, hot water, cold water and ammonium hydroxide in order named. Pulley wheels above and in the tank bottoms guide the work, the lower wheel of nonconducting material. With heavier work, the operator loads the stock and remains at the same post until the plating operation is finished, the material returning to the point of loading where it is removed.

The potash solution removes the oil and grease; hot water removes the potash; double solution of nickel ammonium sulphate provides the nickel plate; hot water again washes the steel, dissolving any salts which may accumulate in the small perforations; cold water removes any material left after the hot dip with ammonium hydroxide eliminates any acid which may remain from the nickel-plating tank. The rubber-lined steel tanks, now in operation in this department, have been in constant use for six years without any outlay for maintenance.

Eight minutes is required for any fixed point on the strip to pass through the complete nickel-plating process following which it is quickly oven dried before annealing. A specially designed annealing pot of nickel-chromium alloy is used—8000 pounds of cold-rolled stock to a heat. For some parts, temperatures up to 1550 degrees Fahr. are required. Cast iron borings are used as a seal in annealing. The equipment includes six oil-fired furnaces with controlled atmosphere.



Steps in forming the positive tube from carbon steel ribbon—perforation, nickel plating, drawing into tubes, loading and ringing. At the extreme right is a tube sectioned longitudinally for inspection. Pieces at the top and bottom have been lifted from a tube winding machine, showing right and left-hand twisting



This machine automatically forms strip spirally into tubes. Stock is fed through a shaping die, the edges being lapped, swedged and the tube cut to length after a joint has been made and a steel cap inserted in one end. Normal capacity of the machine is 20,000 tubes daily

The nickel is fused with the steel in the annealing process and all nickel-plated steel used in battery construction is annealed before final fabrication and assembly. The pots are light in weight, with a high heat resistance, pots being assembled and loaded on rails leading direct to the furnaces. By fusing the nickel with the steel, chipping or peeling of the plating is eliminated. Close inspection is required for all operations and before nickel plating and after annealing the ribbon-like strip is weighed and micrometer readings taken, assuring even deposit of nickel.

Forming Strip Into Pockets

While the steel ribbon for positive tubes and negative pockets is perforated, nickel plated and treated practically the same up to this point, the strip originally is slit in two widths, the slightly narrower for the negative pocket, holding the iron oxide. But from this point on, fabrication differs widely. Strip for the negative pocket is fed automatically into a machine, cutting it to proper length for folding between shaping rollers into a compact one-piece pocket, a flat pocket 3 inches long and ½-inch wide with one end open for filling.

Strip for the positive tube is fed into a machine through a shaping die which forms the material spirally into a tube ¼-inch in diameter, at the same time automatically lapping the edges over each other, making a perfect joint. The lapped seam is then swedged and the tube is cut to length, 4½ inches with a steel cap at one end. Tubes are made in "rights" and "lefts", one half being wound to the right and the others to the left. A normal output for the tube forming machine is 20,000 daily and so delicate is the work in setting the forming dies, no workman is allowed to adjust the machine without at least six months' experience.

Ready for filling, the positive tube originally offered a problem which was solved by Thomas A. Edison after much experimentation. To fill the tube with nickel hydrate would not be difficult were it not for electrical characteristics which briefly follow: The charge flowing through the solution from the positive element, nickel hydrate, to the negative, iron oxide, results in oxygen of the iron oxide passing over to the nickel hydrate. The hydrate is oxidized, forming nickel oxide which has a comparatively high electrical resistance. The problem was to divide the nickel hydrate into thin layers and to conduct the charge to these layers by alternate layers of metal. To solve this problem Mr. Edison developed the process by which pure nickel flake is obtained. Here again the operation is largely automatic.

Plated on Cylinders

Carrying ten revolving copper cylinders, a traveling overhead crane lowers the cylinders in parallel rows into a series of tanks, one for each cylinder. Cylinders are dipped alternately into copper, water and nickel baths, being automatically lowered and raised. The revolving cylinders remain in the nickel bath 23 seconds, about 7 seconds in the copper with a water bath between each dip. Each nickel bath deposits a film of that material approximately 0.00004-inch thick, while a thin film of copper is also deposited between the layers of nickel. The ten cylinders are automatically dipped 125 times in the nickel bath and 125 times in copper, being washed with water between each bath. There are thus 250 films of nickel and copper deposited on the cylinders. While time required for copper coating is not so important, the period of the nickel bath is accurately regulated by a circuit breaker and ampere-hour meter combined to allow automatically only sufficient current to pass to deposit the nickel to the correct thickness in each bath. Approximately 5 hours is required for the production of a 250-layer sheet 0.0075-inch thick. In this department there are ten units of ten cylinders each.

The sheet is stripped from the cylinder, fed into small automatic shears and cut into strips 1/16-inch wide. The strip then is turned and cut 1/16-inch again, thus reducing the entire sheet into 1/16-inch squares. Placed in a solution, the copper is dissolved, pure metallic nickel remaining. This is thoroughly washed, the water then being forced out by centrifugal means. Dried over steam coils and screened, the pure nickel is ready for loading positive tubes. A bushel of these flakes weighs but 4½ pounds. Placed one on top of the other, it would take 85 flakes to equal the thickness of paper used for the ordinary book.

Tubes Filled by Machine

Development of special machinery was required for automatic filling of tubes, the next operation in making the plates. In groups of eight, a small steel cap is inserted in the bottom after which the tubes are placed in a mold. The latter is placed in a machine directly under a row of fixed tubes through which metal rods pass. Two hoppers, one holding nickel hydrate and the other pure nickel are attached to the tube-loading machine, each feeding a specific quantity of each material to loading fingers of the machine which press a minute layer of each material alternately into tubes held by the molds. The metal rods, with a pressure of 2000 pounds per square inch, ram the layers home. There are approximately 650 layers to a 4½-inch tube, the ramming process being timed with the loading parts, each downward thrust being automatic. As each tube in the group is loaded, the plunger for that tube is automatically cut out and stops. One tube is taken from every lot filled, split longitudinally and examined under miscroscope. Should faulty filling be revealed, the error is detected and the lot rejected, thus

making certain the tube-filling machines are operating perfectly.

Each tube is reinforced by eight seamless steel rings, spaced at equal distances on the outside surface, this following early experiments which indicated the oxidizing of the hydrate has a tendency to swell the tubes. Rings are punched automatically ten at a time in a punch press from high-grade cold-rolled steel strip of special specifications. As the strip passes through the press from a reel it is taken up on another reel and wound as scrap.

A progressive die principle in the punching of these rings results in the last die, at which the strip stops for punching, forcing the inside edges of the holes for rims or flanges, equal in depth to that of the desired rings. The dies that force down the edges are encircled with a hard steel shell which reaches the strip ribbon 1/16-inch behind the die and cuts off the rim. Rings are nickel plated and fed into a machine which automatically rejects those imperfect. As a result of the progressive dies in punching, the width of the bands is thicker than the steel stock from which the rings are made. Seamless rings and the filled tubes are placed in a machine, a plunger working through the side forcing the tubes through the rings which gravitate into eight equidistant grooves to the correct position on the circumference of the tubes.

Tubes Attached to Grids

The tube is then closed, finally capped, inspected and placed on a nickel-plated steel grid, being mounted alternately as to rights and lefts and then fixed permanently in the grid on a 40-ton press. Each positive grid plate holds 30 tubes. In closing, each tube passes through a machine, automatically flattening the end outside the caps. The "ears" on the grid in the finishing of the positive plate are pressed flat over the flat ends of the tubes, which being reinforced and staggered as to "rights" and "lefts," gives complete and strong contract between the grid and every tube.

Filling and tamping the negative pockets in major details follow that employed in the same operations for the tubes. In fixing contact with the grid, however, 120-ton hydraulic pressure is used, the pockets being placed over the openings of the negative grid and the pockets firmly clamped to the grid. Thirty tubes and 24 pockets are clamped into each grid. Thus the negative and positive plates or cells are completed for assembly into the battery, the number of plates depending on the size and power of the finished unit.

Positive plates are mounted on a steel rod attached to a vertical steel pole, each plate being equally spaced by steel washers. Negative plates are mounted similarly, the plates being alternately negative and positive, between which, to prevent contact, are inserted hard rubber rods or pin insulators. Further insulation as grid separators, hard rubber ladder pieces are fitted to the plate edges and electrical elements are assembled and ready for the container.

How Container Is Made

Cold-rolled sheets of No. 20 gage are corrugated flat by hydraulic pressure and formed in two operations on a power press in fabricating the container, the material being nickel plated and heat treated before being shaped. The corrugations are on the sides of the container to increase strength and improve heat dissipation, the sheet having been cold rolled to 0.037-inch thickness. Grids are stamped from rerolled strip reduced to 0.025-inch, on a 300-ton press.

After forming, the single seam of the container is welded by an oxy-acetylene torch moving horizontally along the work which is clamped to a stationary fixture. The top and bottom of the container are stampings from nickel-plated strip, first reduced to 0.037-inch by rolling. The cover stamping has outlets for the poles, valve and filler cap. The bottom is welded to the container after which the assembled plates are placed in the container with thin sheets of rubber on the sides not already insulated by the grid separators. Hard rubber washers are dropped over each of the vertical poles.

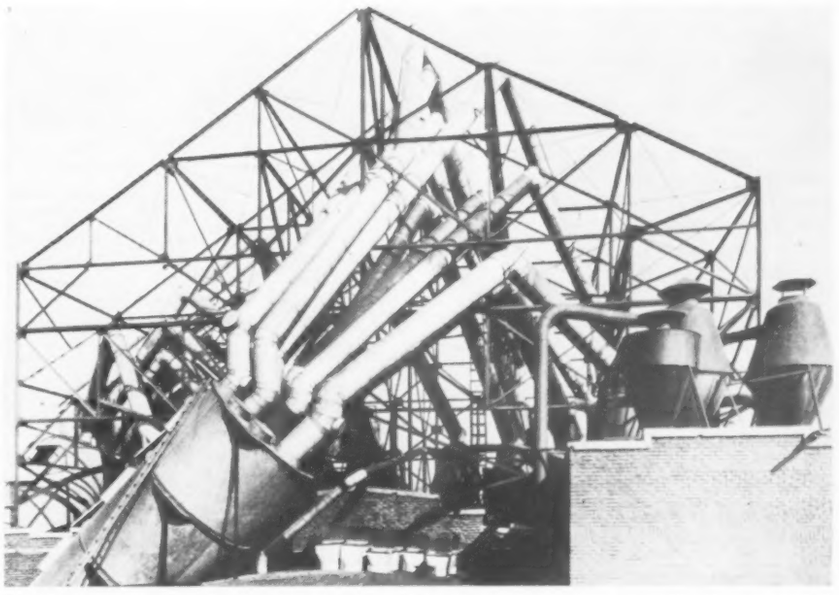
The cover then is welded to the container, also the mountings at the poles to the cover. Fittings through which the poles pass have soft rubber washers, which, with rings and gland caps, allow expansion of the washers to form a gas-tight and liquid-tight packing between the top of the container and the poles. A copper wire is swedged into steel lugs connecting the two poles.

A steel valve box in the cover allows entrance for distilled water or solution and in the top of the lid, a small valve allows gases generated to escape without allowing air or impurities to enter. Before shipping the cell is washed and dipped in a special paint and insulating compound not subject to changes at either low or high temperatures. To facilitate handling, cells are placed in wooden trays. Cells are supported by bosses on the sides of the steel container which fit into hard rubber buttons at the side slat of the tray.

Chilling of Mill Rolls

Recent experiments conducted relative to foundry practice in the manufacture of chilled steel mill rolls have proved that expansion in the chill need not necessarily be in the gray iron casting.

Sheet Steel Octopus



UNUSUAL DUST COLLECTION SYSTEM: This extensive installation recently was built at the Baltimore plant of the Crown Cork & Seal Co. The system was fabricated from copper-bearing sheet steel supplied by the Bethlehem Steel Co. through Charles T. Brandt Inc., Baltimore, sheet-metal contractor. The ducts are shown leading from the roof to a large settling pipe. Copper-bearing sheets were used to minimize the effect of weather attack

A B C of Methods Employed in

BY JOHN F. WYZALEK
Hyatt Roller Bearing Co.

THE art of carburizing is old, being known for at least 1000 years—we have evidence of this through Japanese swords, which indicate differential carburization whereby the cutting edge is hard and the back is appreciably softer and tougher. The science of carburizing is relatively new, since only 150 years ago, in 1786, to be exact, several European scientists identified carbon as the element being absorbed in the carburizing process.

The technical purpose of carburizing is perhaps best explained by quoting the *National Metals Handbook*, which states as follows: "Purpose of carburizing is to obtain through the penetration of carbon in the article subjected to the process, an outside portion high in carbon, generally known as the case and which gradually decreases in carbon content towards the center of the piece. After suitable heat treatment, this case is hard and resistant to wear."

Lower Cost May Be Aim

The practical purpose of carburizing is either to effect lower manufacturing costs as a substitute for medium and high carbon steels wherever such substitution is practical, or to provide a steel with a composite of a hard surface to resist wear and a tough ductile surface to withstand shock.

A number of types of carburizing compounds are used, the most popular of which would probably be a charcoal coke base type with energizers such as barium carbonate, calcium carbonate, or sodium carbonate. Experience with this type of carburizer indicates that the barium carbonate energized material is the most desirable, due to the fact that the character of case produced is found to be more uniform, both from the carbon content and depth of case standpoints. Other types of compound used extensively are (1) the pellet type, wherein the ingredients are ground fine and then formed into pellets; and (2) hydrocarbonated bone black with or without energizers. There is still in use some compounds wherein carbonaceous materials such as charcoal, raw bone, charred leather and charred bone are used mixed without the addition of energizers.

Desirable features in a carburizer are: (1) Rapid penetration with desired carbon content in the case; (2) lasting qualities to insure uniform carburizing performance; (3) low specific gravity, that is, minimum weight per cubic foot, to give maximum volume per ton purchased; (4) minimum shrinkage of carburizer when subjected to carburizing temperature, thereby permitting use of containers to maximum capacity; (5) good thermal conductivity to aid rapid, uniform heating of the charge; (6) freedom from impurities which would contaminate the steel either through absorption or deposition.

Experience has indicated the necessity of using carburizers in certain definite proportions of new and old material to effect economy, greater uniformity and less shrinkage. The general practice for charcoal coke base carburizers is to use between three and four parts of old to one part of new material. In other forms of carburizer, such as pellet or bone black types, the additions of new are appreciably less, being made in general only to compensate for the losses incurred in the handling of such materials.

Careful Packing Essential

To insure satisfactory carburization, it is extremely important to pack the product in proper manner, taking into account necessary spacing of parts to effect uniform heating and to allow for shrinkage of carburizer by not packing the parts too closely to the top of the container. The shrinkage, of course, would be greater in carburizers of the charcoal coke type and less in the pellet and bone black types. In all instances, however, it is advisable to allow for some shrinkage to prevent exposure of the parts being carburized and thereby to prevent decarburization.

As a further insurance toward uniform carburization, parts should be packed in heat-resisting alloy containers which, due to their characteristic of not scaling when subjected to carburizing temperatures, assures uniform heating. This would not be true with containers made of iron or steel which, after a few runs, would scale appreciably and thereby effect a nonuniform heating of the container, which in turn would seriously affect the depth and character of carburized case produced. Another important requirement in connection with carburizing containers is that they be of proper design to be conducive to uniform heating of the charge and also to insure satisfactory service through minimization of warpage and cracking.

Two Types of Furnaces

Various types of furnaces can be used to obtain satisfactory carburization. Furnaces for this purpose can be classified in two general groups: (1) continuous, covering such as rotary, hearth, pusher, straight through and counter-flow; and (2) batch type, such as oven, car bottom or rotary. For production on a large scale of medium or large size parts, the continuous type of furnace unquestionably would prove of greatest advantage, due to its low operating cost per part carburized. For small parts, regardless of volume, the rotary batch type furnace very likely would be the most desirable. The batch type furnaces, and in particular the oven type, would be the most suitable furnaces for carburization of reasonably small quantities of medium and large size parts. Experience indicates that the continuous type gives the greatest uniformity in case, mainly perhaps due to the fact every container is subjected to identically the same treatment, where in the batch type furnace there is always the danger of a container in one location being subjected to heat in somewhat different manner than the container in another location.

Oil or gas fuel is used extensively with satisfactory results, this being particularly true in the large furnace installations. For small furnaces, however, such as rotary and oven types, gas has been found to be more suitable because of its ability to heat the charge more uniformly. Coal is not used extensively today, mainly because of inability to maintain uniform temperatures in the carburizing chambers.

The temperature to be used for carburization depends largely upon

Carburizing Steel

THE accompanying article, which concerns itself principally with compound carburizing, types of furnaces, and types of steel, is prepared from a paper presented recently before the New Jersey chapter of the American Society for Metals. The author, John F. Wyzalek, is chief metallurgist, Hyatt Roller Bearing Co., Newark, N. J., a subsidiary of the General Motors Corp.

requirements. Broadly speaking, however, for depths of case ranging from 1/32 to ⅛-inch, temperatures between 1650 and 1750 degrees Fahr. are generally used. On the other hand, for depths below 1/32-inch, in general temperatures between 1375 and 1450 degrees Fahr. are used. Experience has indicated the higher the temperature, the more rapid the penetration and the higher the carbon concentration at the surface of the carburized case. The reverse would hold with lower temperatures. Therefore, in practice, to effect satisfactory product at minimum cost, it is necessary to develop the maximum temperatures at which the desired carburized case is obtained, with the objectionable conditions held within acceptable limits.

In many instances where small parts are carburized to relatively shallow cases, approximately 1/64 to 1/32-inch, it is impossible to use any other but temperatures in the neighborhood of 1400 degrees Fahr., since higher temperatures would distort the parts and at the same time make it impossible to produce a case within close limits so as to insure a hard surface with a ductile core.

Double Treatment Evolved

Frequently, especially with carburizing at temperatures around 1700 degrees Fahr., a practice is resorted to whereby the last part of the run is at an appreciably lower temperature so as to effect a diffusion of the carbon in the case. Such diffusion of the carbon sometimes is desirable to effect better wear resistance and to minimize checking in grinding of the carburized and hardened parts.

Method of cooling from the carburizing temperature can be either slowly, such as cooling parts in the carburizing containers, or rapidly, by removing the parts from the container and quenching. Wherever the parts are of such shape and size as to make it practical to quench direct, using alloy steels, it has been found possible to obtain better physicals in the finished parts at a lower cost than possible with similar parts being slowly cooled and re-treated. This direct quenching can be applied either as an operation replacing the so-called "first heat" normally given for refinement of the core, or can be utilized as a final quench, eliminating entirely all subsequent hardening operations. The latter can be effected in a very practical manner by using steels for carburization of a fine grain type, having a grain size of 6 or finer in accordance with the A.S.T.M. standard.

At times localized carburization is necessary and can be effected in various ways. A common and popular means is to copper or chrome plate the areas which are desired to be free from carburization. Other times mechanical means are adopted, such as the use of studs and washers to partially insulate the bores of cylindrical parts or the application of sheets of copper to the locations where prevention of carburization is desired. Other methods employed are the application of specially prepared pastes which experience in general has indicated to be very frequently unsatisfactory, or the use of sand which in days past was popular, but to which there is considerable objection, mainly due to the fact that sand contaminates the carburizing compounds and at the same time is a poor heat conductor. Finally, a method frequently used is to allow extra stock at the point where carburization in the final product is not desired and after carburization, removing this excess, thereby effecting the desired condition.

Carbon Content Usually Low

Types of steel to be used for carburization will naturally vary with the requirements for satisfactory service of the particular part involved. However, it is appropriate to state that in general carbon content below 0.15 per cent would be desirable for high ductility and good shock resisting qualities, but having low core strength and poor machining qualities, while steels above 0.15 per cent, up to about 0.25 per cent carbon, would sacrifice some ductility and shock resisting qualities, but offer greater strength and better machining qualities. For lower duties, carbon steels are suitable and for service where the duty is critical, alloy steels are extensively used.

Grain size control is now frequently resorted to in carburizing grades of steel. It is found that the finer grain types, although offering slightly poorer machining qualities, more than offset this disadvantage by making it possible in many instances to quench directly from the carburizing temperature, eliminating thereby all subsequent hardening treatments and producing in the finished condition a product quite often superior to that obtained with the coarser grain types given the double re-hardening treatment after the carburizing operation.

Gas Carburizing Gaining

Gas carburizing is less extensively known than the compound method. However, indications are positive that gas carburizing is on its way and unquestionably in larger installations will replace compound in the near future. This change is being brought about by the fact that the gas method enables the user to produce the desired results at a lower cost under more satisfactory working conditions in a shorter time cycle. The rapidity of its adoption will depend, of course, a good deal upon the cost of installations, which at present are rather high, being thereby of attraction only to the larger manufacturers. It is believed that with more extensive usage of the gas carburizing method, the cost of the equipment will be lowered and thus its use materially extended.

Gas carburizing is being effected through the use of such gases as methane, propane, butane, manufactured or city gas and nicarb. The last mentioned represents a duplex process of nitriding and carburizing effected through the use of ammonia gas in combination with any of the carburizing gases. Results so far with gas carburizing indicate very definitely that with proper control it produces work superior to that with compound and at a very materially lower cost. Carburization with gas can be effected in either rotary, batch type or continuous furnaces. Several furnace companies now are in position to furnish carburizing furnaces using gas as a medium, the type to be obtained depending upon the particular requirement.

This is reported to be the world's largest cargo of petroleum as it was moved down the Mississippi river by the SPRAGUE. *Nineteen steel barges are included, loaded with 224,000 barrels of crude oil*

Forged Shaft in River Craft Replaced After 30 Years

BY EDWIN F. CONE

AN INTERESTING application of forged steel was completed recently by the Bethlehem Steel Co., Bethlehem, Pa., when a large hollow nickel steel wheel shaft was forged for an old-style rear paddle-wheel river steamboat. The shaft was furnished to replace one that had been in service for over 30 years on the steamer SPRAGUE now plying between Baton Rouge, La., and Memphis, Tenn., on the Mississippi.

The new shaft was installed in January, 1934, and the SPRAGUE took up her regular duties on Feb. 9. The original shaft also was of nickel steel, hollow forged. Its dimensions were:

Overall length	47 feet 2 inches
Outside diameter	31 inches
Inside diameter	21 inches
Ends closed down to an inside diameter of	10 inches
Shipping weight	80,220 pounds

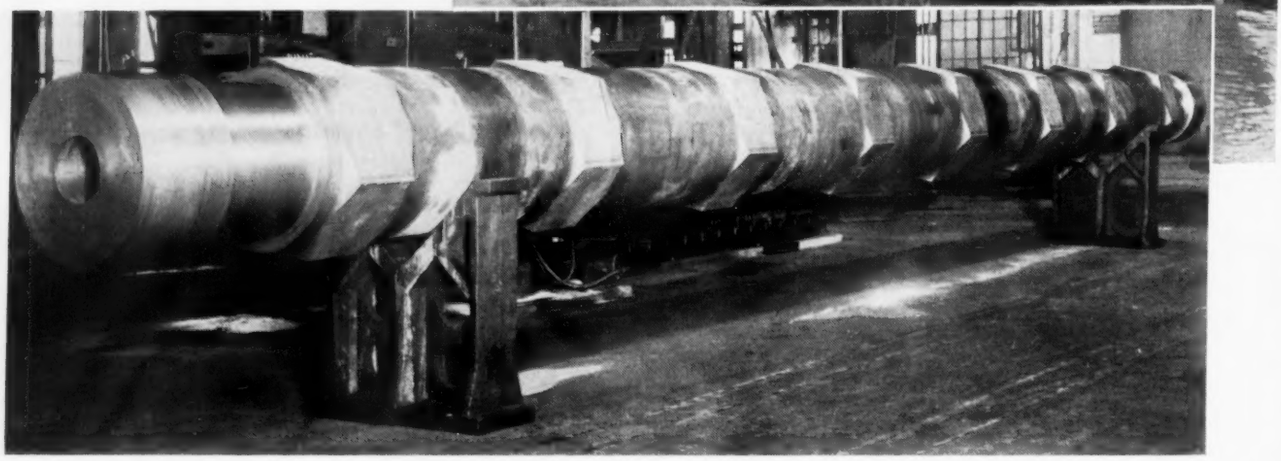
Physical properties of the steel were as follows:

Tensile strength	81,810 lbs. sq. in
Elastic limit	51,130 lbs. sq. in.
Elongation	25.50 per cent
Reduction of area	49.37 per cent

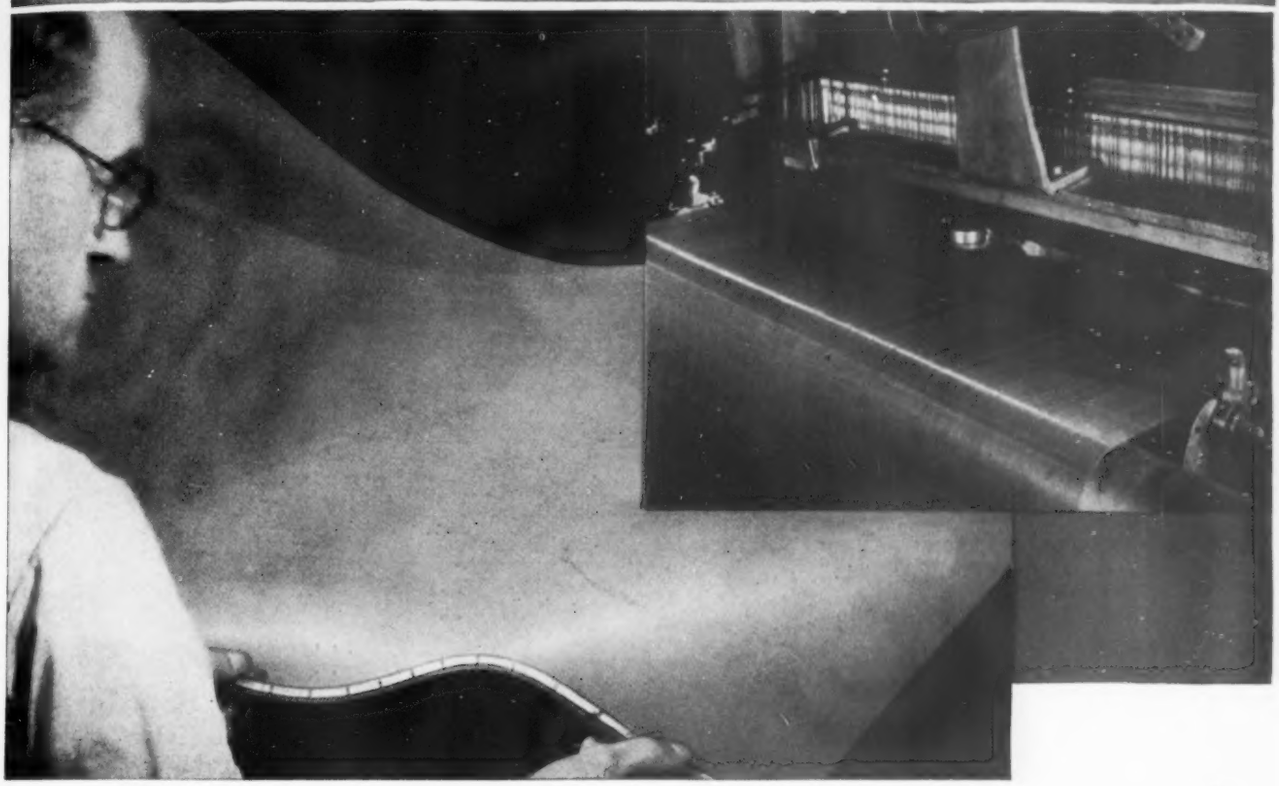
The new shaft was of 3.25 per cent nickel steel and had the same dimensions as the original one. It was hollow forged, then rough bored and the ends closed in. Its shipping weight was 78,305 pounds. Its heat treatment consisted of a series of air and furnace coolings and its final physical properties showed an average tensile strength of 90,000 pounds per square inch, an elastic limit of 54,000 pounds per square inch, an elongation of 26.5 per cent and a reduction of area of 57.3 per cent.

The steamboat on which the shaft was replaced is claimed to be the largest river steamboat in the world and its history is therefore of interest. Built in 1902 and 1903 by the Iowa Iron Works Co. (now the Dubuque Boat & Boiler Works), Dubuque, Iowa, for the Monongahela River Consolidated Coal & Coke Co., Pittsburgh, the vessel has a length of 315 feet, a beam of 62 feet and a hull depth of 9 feet. The propelling stern wheel has a diameter of 37 feet with bucket planks 4 feet

AT THE RIGHT is the old-style river steamer SPRAGUE, *in which a hollow-forged nickel steel shaft recently was replaced after 30 years of service. Below is shown the new shaft as it appeared before shipment from the forge shop. Over 47 feet in length, it weighs nearly 80,000 pounds*



he dictates Wire Specifications



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Just as every weaver of screen cloth knows clean, quality cloth can only be made from clean, even tempered, uniformly full gauged wire. He may not tell us how to produce it but it's his exacting demands that dictate as to our wire making methods. Other users of Wissco Wire enjoy excellence built up by the combined dictates of all Wissco users. You, too, may dictate as to Wire Specifications based upon your own requirements.

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Wickwire Spencer manufactures High and Low Carbon Wires—in various tempers, grades and finishes—for your specific purpose. Hard-Drawn, soft or annealed Basic or Bessemer Wires—Hard-Drawn annealed, or oil-tempered Spring Wire, Chrome Vanadium Spring Wire—Valve Spring—Music—Clip—Pin—Hairpin—Hook and Eye—Broom—Stapling—Bookbinding—Machinery Spring Wire—Reed Wire—Clock—Pinion—Needle-Bar—Screw Stock—Armature Binding—Brush—Card—Florist—Mattress—Shaped—Rope—Welding. Flat Wire and Strip Steel, High or Low Carbon—Hard, annealed or tempered—Clock Spring Steel—Corrosion and Heat Resisting Wires. Consult the Wissco technical man on your wire problems, however large or small.

wide by 40 feet long, the wheel being turned at an average of 8½ revolutions per minute by two 28-inch by 63-inch by 12 feet compound condensing engines. The complement of the boat at that time was 55 persons.

Originally designed and built to tow coal from Pittsburgh down the Ohio and Mississippi rivers to southern ports, her first large tow of coal is understood to have arrived in Memphis, Tenn., in May, 1904, and was made up of 56 barges and two barges of fuel. The 56 barges contained 1,400,000 bushels of coal, covering an area of 5.9 acres. It is understood that the vessel was assisted in handling this load by one or more tow boats.

Previous to the building of the SPRAGUE, coal barges, made of light wood, were not returned to Pittsburgh districts, but were sold at points where the coal was consumed. Thus each shipment was made in new wooden barges. The diminishing supply of wood, involving an increasing cost of wooden barges, is believed to have led to the design and construction of a vessel of the size of the SPRAGUE, which would be large enough to return the barges to the coal fields for reloading.

For some years the ship was operated by the Monongahela company, but with the introduction of fuel oil and a consequent decrease in the demand for coal, it was laid up for some time. In 1925, however, it was purchased by the Standard Oil Co. of Louisiana and, after extensive repairs, was placed in service between Baton Rouge, Grand Lake, Ark., and Memphis. From that time the steamer was in continuous service until August, 1933, when it was decided to replace the original steel shaft with a new one.

After the installation of the new shaft in January, 1934, the steamer was placed in service transporting fuel oil between Baton Rouge and Memphis. An example of the towing burden which this vessel is now assuming is the record tow of 224,000 barrels of crude oil on one of her recent trips, shown in an accompanying illustration. This tow was made up of 19 steel barges, the over-all dimensions of the fleet being approximately one city block wide and four city blocks long. It would have taken 1120 tank cars of 200 barrels each, equivalent to 28 trains of 40 cars each, to have moved this cargo by rail.

Tribute to Steelmakers

The foregoing facts give a comprehensive picture of the load which the wheel shaft of such a vessel, with the incidental strains and stresses, must move through the water. For nearly 30 years the original nickel steel shaft stood the strain without breakage, but because of the presence of a series of cracks in shaft journals it was thought advisable to replace it.

The record made by the original shaft for a period of 30 years pays high tribute to the technic of steel manufacture in a period when refinements in steel production, heat treatment and other manufacturing details, were by no means of the high order as practiced today. The performance of this shaft leaves much for speculation as to what are the actual limitations for material processed in the present day where highly refined methods and metallurgically controlled practices have replaced the relatively crude and older methods of steel manufacture.

Grinder Handles Tough Steel

TO INSURE A SMOOTH, CONTINUOUS FINISH on machine parts it is often necessary to employ special methods. Such was the case in the East Pittsburgh, Pa., works of Westinghouse Electric & Mfg. Co. when it became necessary to finish the face of the large frame shown above. The face of the frame contains inserts of hard molybdenum steel; to make a finish cut sufficiently smooth with the tool running on and off the hard sections was impracticable, therefore a medium grit carborundum grinding wheel was used. The frame weighs 64,000 pounds, has an overall height of 77 inches with an outside diameter of 222 inches

Research Data on Axle and Wheel Failures Revealed

"Railroad Axles and Wheel Research" is the title of a paper submitted before the Engineers Society of Western Pennsylvania at Pittsburgh, Jan. 29, by T. V. Buckwalter, vice president, Timken Roller Bearing Co., Canton, O., with P. C. Paterson, Oscar J. Horger and John L. Maulbetsch, of that company, as collaborators in its preparation. The paper embodied data which so far have resulted from the research program which this company has had under way for the past two years at the University of Michigan laboratories and in its own physical laboratory. Fatigue failures occurring just inside the face of press fitted members were discussed in this paper, which was extensively illustrated with photographs and drawings of specimens studied photoelastically.

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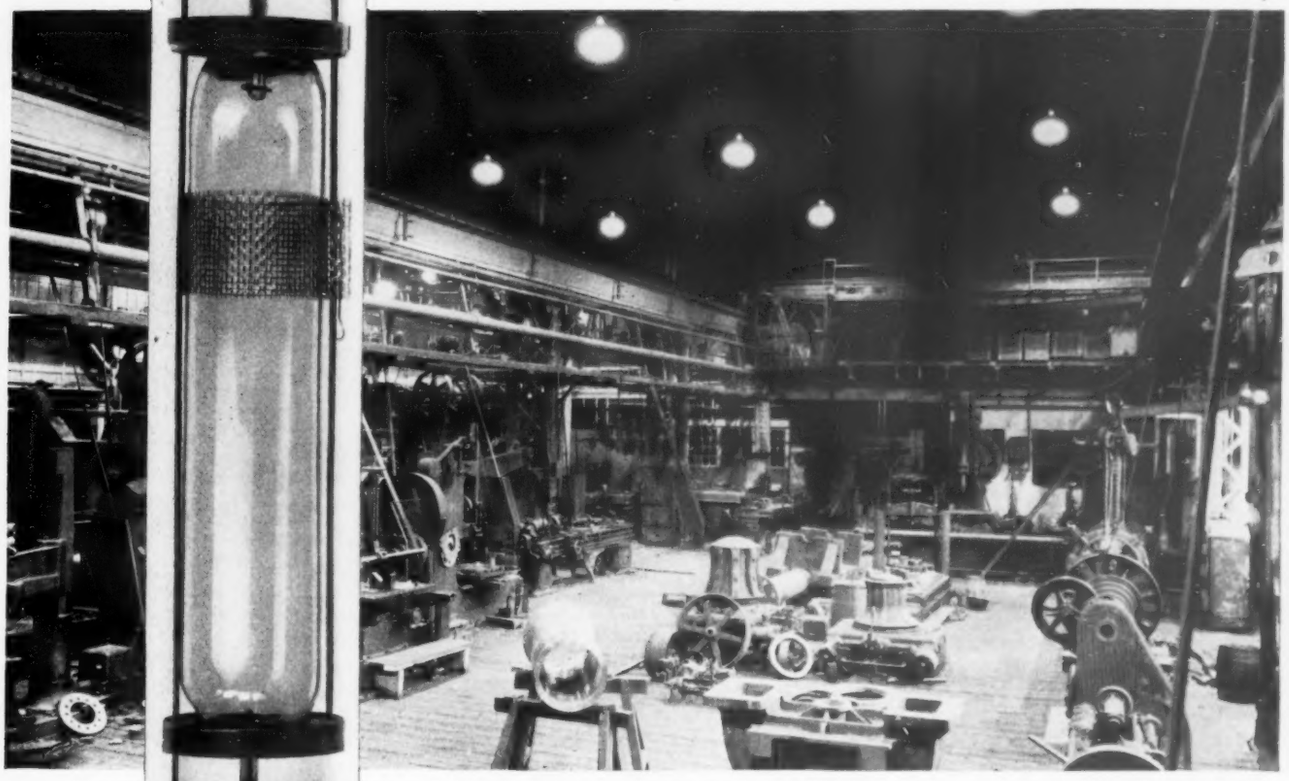

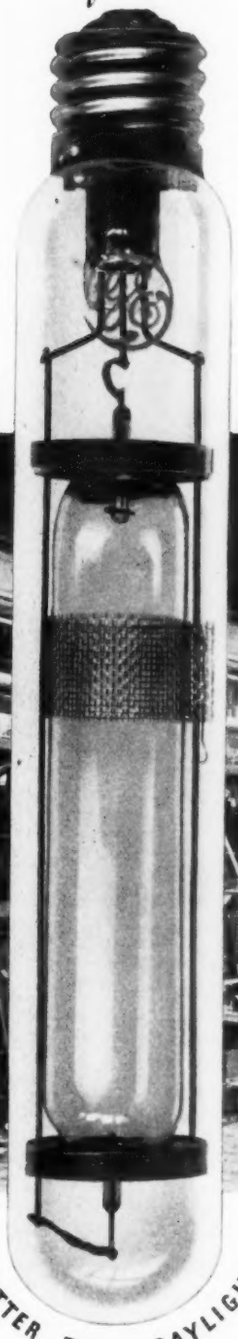

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The story of "Better Lighting For High Bays" is briefly told in this bulletin. Write for a copy.

GENERAL ELECTRIC VAPOR LAMP COMPANY

605 Copr. 1934, General Electric Vapor Lamp Co.

Herringbone Gears Cut with High Degree of Precision

BY W. E. SYKES
Farrel-Birmingham Co. Inc.

WHEN a lubricant much too viscous is used on any kind of gears, a noise is caused. This condition exists when straight tooth gears are used, or any kind of gear, and it calls for no criticism of the gear. The lubricant is at fault. There have been cases where users have cut a groove through continuous herringbone teeth and thus have cut away the backbone. Occasionally it has been stated that by so doing, the gears have run more quietly; but, when such a claim is justified, the cause of the noise is incorrect apices due to faulty workmanship.

THE accompanying article is abstracted from a paper presented before the American Gear Manufacturers association in Milwaukee, Oct. 22. The author, W. E. Sykes, is associated with the Farrel-Birmingham Co. Inc., Ansonia, Conn.

Herringbone gears of the Sykes type cut with reasonable care run equally well with any type of bearing. Thousands of gear units of the design shown in Fig. 2 are in successful operation. In this design tapered roller bearings are used and a perfect tooth bearing is obtained without any end float which proves that deflections are only sufficient to give the desired result and that the degree of precision is of a high order.

When the shafts with these herringbone gears are subjected to a heavy thrust load, Kingsbury bearings can be used to carry the thrust, leaving the journal bearings to handle the torque loads.

Because of the overlapping tooth contact of herringbone gears, the tooth deflections are so small as to be only sufficient to compensate for almost infinitesimal inaccuracies excepting when the load is abnormal, and then the weakest part deflects and throws the load onto the strongest part which has been called the stiffened center section. This is an ideal condition.

When gears have to operate silently at high speed, they need to be made with a degree of precision similar to that necessary in ball and roller bearings for high-speed operation; this applies to all types of gears including worm gears and bevel gears.

In some applications continuous tooth herringbone gears of the Sykes type are run with apices trailing instead of in the opposite direction which is more conventional. When the apices trail more oil is carried through the teeth for a given height of oil level; thus there is less churning of the oil and less heat generated. The V-shape of the teeth helps to squeeze the oil into the "bite" of the teeth.

This is a particularly important advantage of this type gear. The tools used have the form of pinions or gears. They are sharpened in a manner that their cutting edges are in the plane of revolution and the axes are parallel to the axis of the gear being cut.

The cutting edges are formed by angles which provide the proper side relief and top rake; and the contours are generated by a grinding and polishing process to a maximum tolerance of 0.0002-inch.

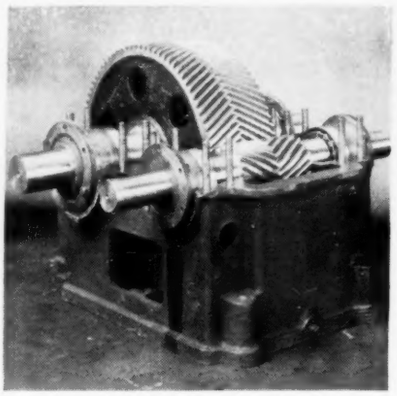

Fig. 2—Speed reducing unit of the herringbone type designed with roller bearings

In action these cutters traverse right across the face of the gear. At the same time, the gear is revolving slowly in unison with the cutters. The result is that the teeth generated are all parallel and uniform in pitch, correct in thickness, smoothly finished and remarkably accurate in every respect when the machine is in good condition, the cutters properly sharpened, and reasonable care and skill is exercised by the machine operator. Both the cutters and the work revolve continuously. There is no intermittent motion. Moreover, the index wheels, which are the most important elements of any gear cutting machine, revolve slowly so that the wear measured over a period of 10 years, with working time of 20 hours per day, is negligible.

Forged steel of 310 brinell hardness regularly is cut by these machines. A hardness number, however, is not a true indication of the cutting characteristics of steel. Some alloyed cast steels are more difficult to cut when 200 brinell than others of 300 brinell. Neither is a hardness number a true indication or measure of the cutting tool capacity.

One of the latest type Sykes machines cutting a pinion integral with its shaft is shown in Fig. 1.

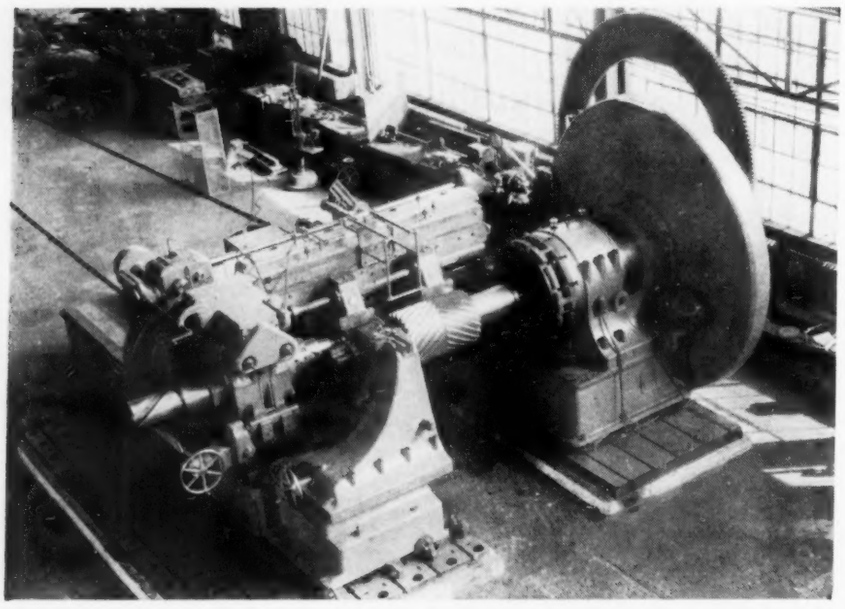

Fig. 1—Sykes gear cutting machine showing a pinion being machined integral with its shaft

SWIFTLY...

THE STEEL PICTURE CHANGES

NEW ANALYSES . . . advances in grain refinement . . . improvements in processing—all follow so rapidly that steels considered perfectly satisfactory for certain applications only a year ago are too costly today.

● For example, Republic's Improved Series of S. A. E. 3100 Steels are made to new standards of metallurgical control. They are finer grained and far superior in many respects to the former 3100 steels. They machine more readily and are suitable for many applications for which higher priced alloy compositions are now being used.

● When a Republic man asks, "Can our Metallurgists help you?" he is offering you the collective knowledge and experience of a metallurgical staff that is abreast of every new development. Perhaps these Republic Metallurgists can help you reduce costs and improve your product.

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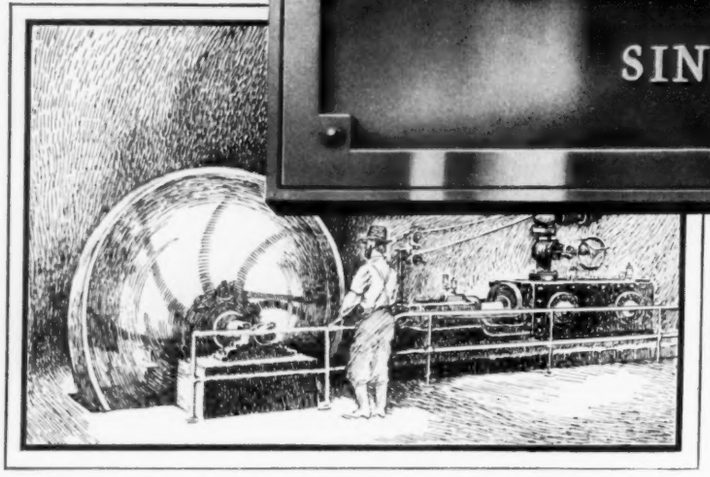


Edison Institute, Dearborn, Mich., Home of the Ford Historical Collections, covering Americana, Science and Industry.

It made Prime Mover History in 1868 . . . that becomes permanent history today

The Engineer at the Allegheny County (Pa.) Workhouse was a proud man that day in 1871, when his new Mackintosh-Hemphill engine (built in 1868) was installed. There it rested on the cut stone base, its stay-bolts leaded in place. The last word in steam engines. A masterpiece of precision. Bolts and nuts lathe-finished. A pilot-wheel type throttle valve. Its thirteen-foot fly wheel a single casting. Its cylinder lubrication provided by tallow-pots.

Continuously it ran until 1924. Its original duty —providing power for the stave shop—increased until it was driving a 300-foot line shaft, powering the rug-making, carpenter and machine shops.

Not until the equipment was motorized did they retire this engine, even then good as new for all practical purposes.

Mackintosh-Hemphill was proud when in 1934, this old steam engine was purchased by Henry Ford to be given a permanent home in Edison Institute. The original name plate still records the engine's origin and age . . . the precision of its workmanship is still a lasting tribute to the ability of a Company already sixty-five years old when the machine was built.

Today Mackintosh-Hemphill *experience*—grown to 132 years—is translating itself into new methods and new machinery for any department of steel and non-ferrous processing and finishing—ability ready to be demonstrated to you. May we have the opportunity?

How Mackintosh-Hemphill Experience Can Be Put To Work For You

The M-H Research Department has developed a unique surface-hardening process, which permits accurate control of hardness depth, area and degree, leaving intact the backbone of original metal. Not only for rolls, but for all applications where ultra-strength and ultra-wear must be combined, it has proven its value . . . May we tell you about it?

MACKINTOSH HEMPHILL
PITTSBURGH

METHODS AND MATERIALS

Titanium in Steel Raises Corrosion Resistance

Considerable development work has been done during the past few years on steels containing 4 to 7 per cent chromium. These steels have found wide application in the petroleum industry and are being used to a considerable extent for incinerator and furnace parts where they are subjected to moderately high temperatures and to mild corrosive action. Recently, further experimental work on these steels was carried on at the Union Carbide & Carbon Research Laboratories Inc., Long Island City, N. Y., and results indicated that the addition of titanium to such steels reduces greatly their tendency to air harden, and makes them more resistant to oxidation at elevated temperatures.

S S S

Finishing Parts for Type Composing Machines

Between 0.008 and 0.009-inch of metal is removed internally from stud bushings and stud blocks used in the construction of line type composing machines. This is done on an automatic grinding machine equipped with a 60-grit, grade L, silicon carbide wheel, 3/8 x 1/2 x 3/16-inch. The spindle rotates at 30,000 revolutions per minute and the work at 750 revolutions, with the traverse speed automatically adjusted to provide the proper finish.

S S S

Selecting Cast Steels for Deep Hardening Effects

Since chromium, molybdenum and vanadium increase the tendency to harden, cast steel compositions such as chrome-nickel, chrome-molybdenum, chrome-vanadium, and chrome-nickel-molybdenum, often are used where depth of hardness is an important factor, or where it is necessary to obtain high hardness values with a mild quenching treatment. These steels usually have a high elastic ratio but somewhat lower ductility than the intermediate manganese type steels.

S S S

Points Out Advantages of Square Cast Welding Rods

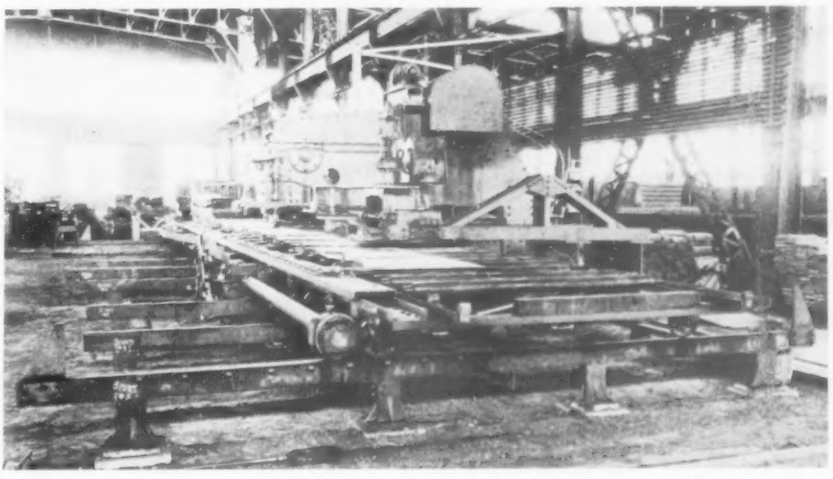
A manufacturer of cast iron welding rods points out that although such rods are made with square cross sections they could be produced as round rods. The manufacturer points out, however, that square cross section rods have certain mechanical advantages for welding and furthermore claims that the square shape is a severe test of the quality of cast iron suitable for welding rods. In other words, inferior quality cast iron can be cast as round rods, whereas only a higher grade iron can be cast into square sections.

S S S

Polarized Light Studies Aid Proper Design Treatment

Parts of machines and structures designed to operate under severe impact stresses give best service and

Punching Machine Has 90-Inch Throat



FABRICATES PLATES UP TO 7½ FEET WIDE AND 20 FEET LONG: Designed not only to punch holes of different diameter, but to notch, cope and punch slotted holes, this machine performs all these operations in one setting, thus reducing handling costs. Of welded steel frame construction, the machine was made in two parts in order that it might be shipped to destination by rail. It is known as the Duplikator, for the reason that it duplicates the holes in a template. Ordinarily the first plate punched is used as the template for the succeeding ones. The machine shown is one of several built by the Thomas Spacing Machine Co., Pittsburgh, for use in constructing freight cars at the New York Central car shops at Avis, Pa. Similar machines, smaller in size, are used in fabricating switchboard panels, concrete mixers, structural plates, boilers, ship plates, screens, road building equipment, steel passenger cars, and other fabricated plate and sheet work

PACKARD "Asked the —then they, too, bought

WHEN Packard engineers set out to develop the most efficient plating plant in the industry, they studied all modern developments in plating tanks. They decided on Goodrich tanks with Triflex rubber lining for these reasons which will interest every engineer:

1. Goodrich tanks are virtually leak-proof—they are built to last for years, and so reduce plating cost.

2. Goodrich tanks never contaminate plating solutions—unlike some rubber linings, these need no "dope" to provide adhesion.

3. Should accidental damage ever cause a leak, Goodrich tanks can be repaired on the job, with minimum delay to plant production. And the leak is quickly detected, before costly harm is done, because it always appears exactly opposite the point at which the lining is damaged.

To engineers used to the usual constant-leak plating tanks, these are startling improvements. Here's what assures these same advantages to every Goodrich user:

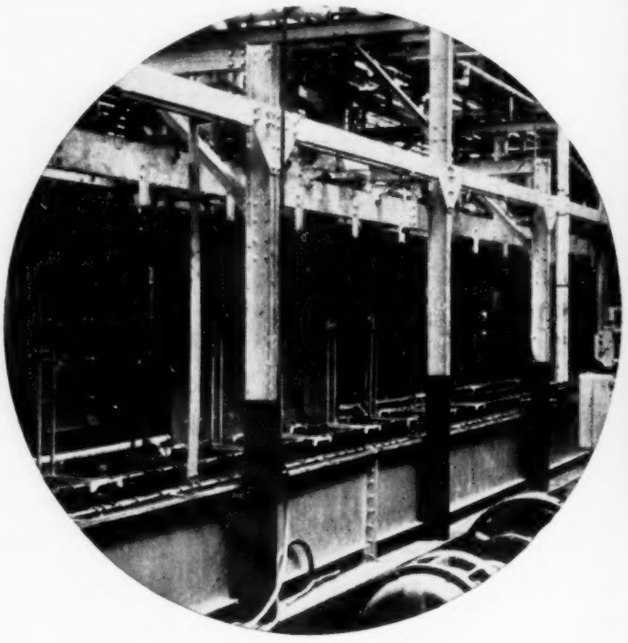
1. Goodrich tanks consist of three layers of rubber—one of hard rubber between two cushioning layers of soft.

2. Expansion joints *in the rubber itself* take care of all expansion and contraction caused by alternating heating and cooling.

3. This rubber lining is attached inside the steel tank by the exclusive Vulcalock process, which gives permanent adhesion of 500 to 600 lbs. per square inch.

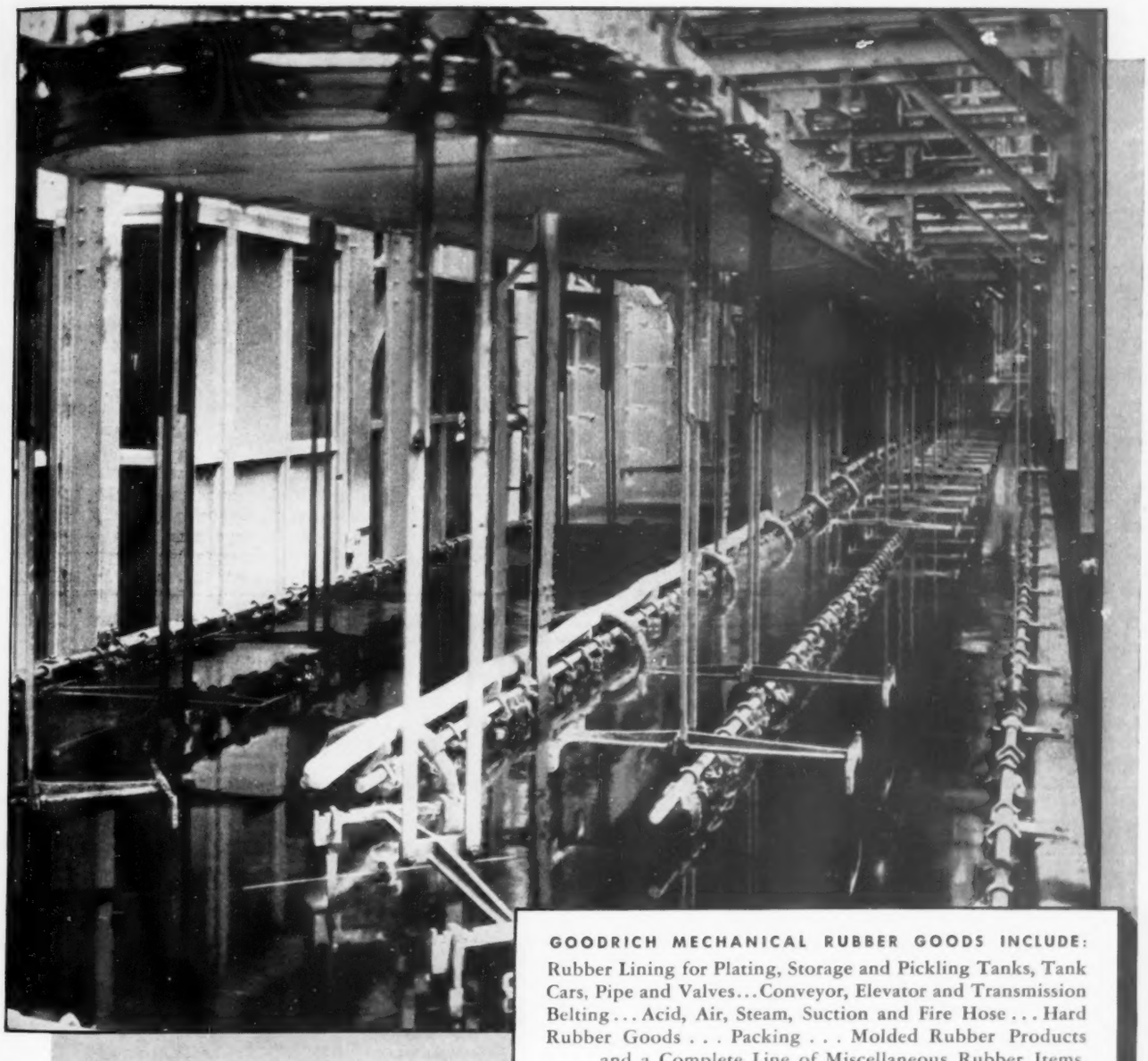
4. For severe service, the rubber lining may be protected by brick. In this brick sheathing are rubber expansion joints which prevent buckling or cracks.

At Goodrich are engineers who have specialized in plating tank linings. They will work with you in studying your situation, at no cost nor obligation. Write The B. F. Goodrich Co., Mechanical Rubber Goods Division, Akron, O. (In Canada: Canadian Goodrich Co., Ltd., Kitchener, Ont.).



Goodrich

Man who owned one"
GOODRICH TANKS..



GOODRICH MECHANICAL RUBBER GOODS INCLUDE:
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Above and left—two views of the Packard installation of Goodrich Tanks.

Rubber Lining ALL *products problems* IN RUBBER

longest life only if properly designed. Thorough study of various bakelite specimens by means of polarized light shows that notches, irregularities and other sudden changes in cross section set up severe concentrations of stresses and that these concentrations best may be avoided by keeping the cross sections as regular as possible.

S S S

Racing Yachts Making Use Of Alloy Steel Fittings

To reduce weight and increase speed, racing yachts are turning to high-strength materials for such important parts as mast supports and fittings. Both contestants in the recent America Cup series were equipped with solid heat treated nickel-chromium steel stay braces instead of the usual cables for supporting the mainmast, thus decreasing weight and obtaining lower wind resistance.

S S S

Better Factory Lighting Gaining Recognition

Because better illumination does cut costs, increase efficiency, reduce accidents and establish better working conditions, lighting in industrial plants everywhere probably will be revolutionized in the next few years, according to L. A. S. Wood, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. At present, industrial lighting averages less than 5 foot-candles, one survey of 2000 industrial plants even averaging below 3, as compared with the safe minimum of 10 foot-candles. Industry is awakening to advantages of better lighting as a result of recent developments in lighting and many industrial lighting surveys.

S S S

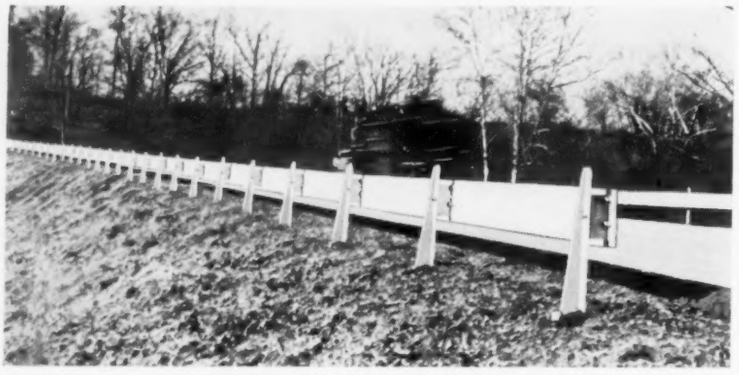
More Builders Using Hard Facing on Engine Valves

Hard facing of automotive exhaust valves and valve seats with stellite is a recent development which is gaining in popularity. Three prominent bus and truck manufacturers have standardized on this practice as tests have proved the desirability of the alloy for this purpose. No regrinding or refinishing of seats has been necessary after runs as high as 150,000 miles, the seating surfaces remaining in good condition.

Tapered Steel Posts Developed To Support Highway Guard Rails

WITH present day road construction and modern high speed traffic, efficient road guards are a necessary, and in many states a legally compulsory part of highway improvement.

The earliest types of road guards made use of such material as was most readily available, the wood rail and wood post construction. In later types, the unreliable wood rail was replaced by a double line of steel cable, although the wood posts were still retained as supports. These wood posts were, as a rule, of some sound local timber—locust in Pennsylvania and neighboring states, redwood on the Pacific coast. In some western states cedar imported from other sections was most commonly used.



Above is an installation of steel road guard posts used in conjunction with steel plate rails on an Indiana highway. At the left is a closeup view of tapered steel road guard post. Photos courtesy American Bridge Co.

Wood posts in general have given good service. However, in some parts of the country, exposure to adverse climatic conditions or to attacks from wood-boring insects materially shortens the life of untreated timber. Preservative measures such as treating with creosote often are employed, but add materially to the cost, which in any case tends to rise because of a diminishing supply of wood. These considerations, together with certain advantages inherent in the material itself—greater resiliency under impact and freedom from any hazard of shattering or splintering—account for the fact that wood posts in some localities are giving way to steel.

Combines Strength and Economy

In late years manufacturers have given much thought and study to the development of steel posts. The type illustrated here, recently developed by the American Bridge Co., Pittsburgh, not only incorporates distinctive advantages in installation but, having its greatest cross section at the ground line, affords a distribution of material best adapted to resist overturning and impact forces with the utmost economy of material.

Rolled shapes such as the standard or wide flange I-beam sections are utilized in the manufacture of these posts, fabrication being accomplished by successive shearing in diagonally opposite directions. This process insures maximum utilization with minimum fabricating costs. The resulting post is equally suited to any accepted type of guard rail construction—wire cable, woven fabric or steel plate—the wide flange providing ample surface for the proper support of the rail, whether directly connected to the post or connected by means of brackets, spring elements, or other types of cushioned offset fittings.

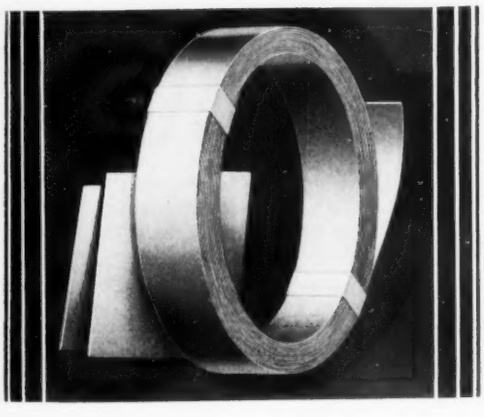
Although the initial cost for the fabricated steel post is somewhat higher than for wood, this is offset by longer life and less expensive installation, so that the final costs are about the same. Installation of the tapered steel post usually involves nothing more than driving it into the ground, and suitable penetration is accomplished readily even in the hardest soils. The necessary driving is done with hand mauls, a special driving cap being used to protect the top of the post, as well as the galvanized coating, from damage. The comparable operation for wood post installation—digging a hole, setting the post, back filling and tamping of the earth, sawing the top to alignment, boring for the attachments and painting—is much more complex and costly. Steel posts are driven into undisturbed earth and the resulting lateral displacement

QUESTION

How can we make

COLD ROLLED STRIP STEEL

an even greater asset?



JUDGING from the standpoint of design and finish of product—unit cost of manufacture—service rendered—volume of sales—is your application of Cold Rolled Strip Steel completely successful? If there is the least question in your mind about further improvement, it will be to your great advantage to talk it over with Cold Rolled Strip Steel headquarters. Every executive will be interested in seeing how and learning why American Quality Cold Rolled Strip Steel is helping others reduce unit costs while increasing sales opportunity. Send for illustrated catalog which gives detailed information on sizes, gauges, tempers, thicknesses and finishes—also facts about the resources and facilities back of American Quality Cold Rolled Strip Steel.

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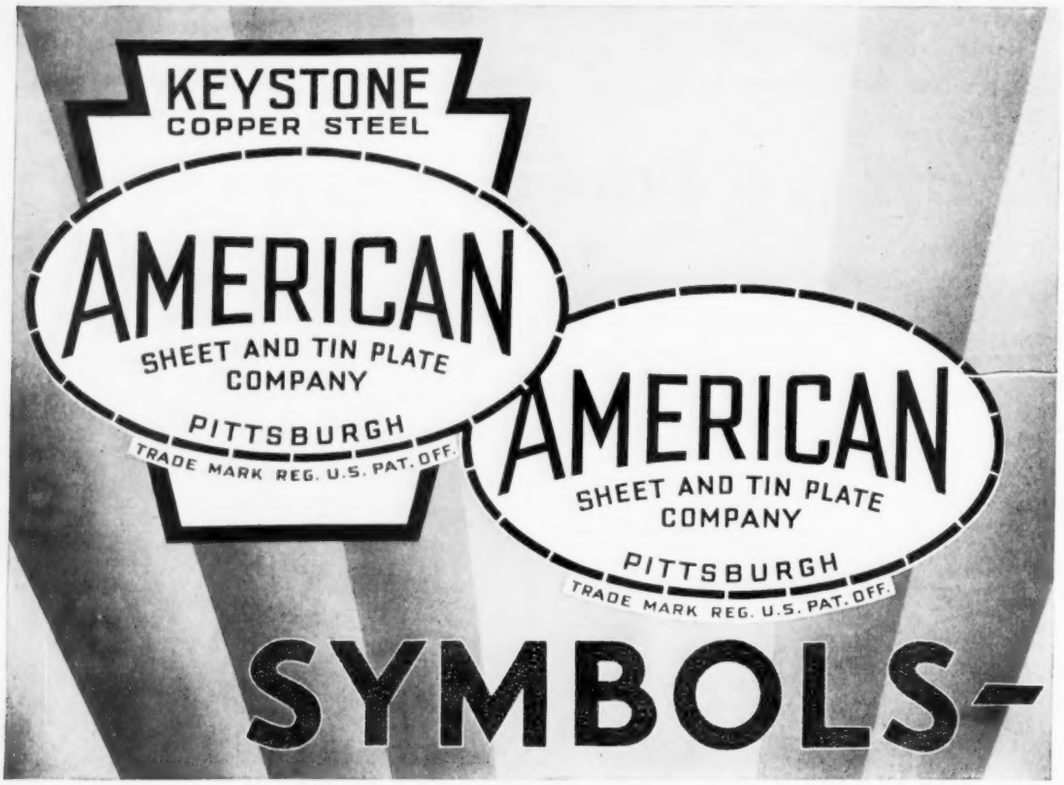

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materially increases the holding power of the earth.

This type of steel post is usually furnished with a heavy protective coat of structural galvanizing. Similar galvanized coatings have been used on transmission tower anchors for a long time and under normal soil and atmospheric conditions have been found to endure for upward of 25 years without serious deterioration. Galvanized coating has the added advantage over paint that it is not scraped off or damaged in driving, and that maintenance expense is almost entirely eliminated.

Wax Coated Rubber Rings Used in Multiple Corrosion Tests on Paint

IN TESTING the chemical resistance of paint coatings, the common practice of immersing a painted panel in a reagent has the disadvantage of requiring an individual panel for every test made. This proves cumbersome and expensive. Thinly coated panel corners also break down, making accurate recordings difficult.

Another method, that of putting several drops of a reagent on a panel and covering with a watch glass, has proved unsatisfactory from the standpoint of confining the reagent to one particular spot. Tilting will shift the reagent, and inspection will be difficult because of the tendency of he reagent to collect on the inner edge of the glass. In the event the watch glass seal is not tight, further difficulties arise in obtaining accurate data due to an increased concentration of the reagent resulting from evaporation.

For these reasons a spot method has been developed by laboratories of the Sherwin-Williams Co., Cleveland. This innovation permits the spraying of a uniform coat on a panel. Several reagents can be tested on the surface of each and recordings may be kept alongside.

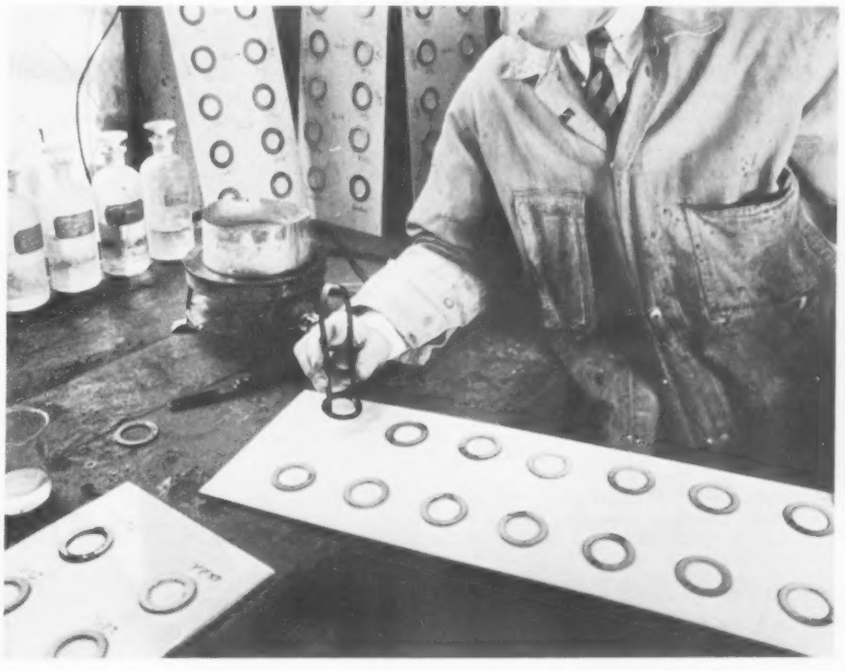
How Rings Are Cut, Mounted

An airtight seal is made as follows: Rubber rings are cut from 1/16-inch inner tube stock. The inside diameter of the rings is 1⅛ inches and the outside diameter is 1¾ inches. After cutting, the rings are immersed in a melted mixture consisting of 50 parts paraffin, 20 parts carnauba wax and 30 parts Halowax 1013. While the melting point of the mixture is about 200 degrees Fahr., it is advisable to hold the temperature of the melt between 250 and 300 degrees Fahr. to prevent solidification of the wax when rings are immersed.

Centers for the rings are marked off on the panel to be tested. The panel then is placed under a hot water tap reverse side up. This prewarming prevents chilling of the wax when the dipped rings are placed on the panel. Excess wax is always drained off the rings before placing them on the panel, after which they are pressed at several points to insure complete contact. As soon as the wax has cooled to the point where the surface gloss is lost, a 2000-gram brass weight is applied to mold the top of the wax to a smooth, level surface.

One cubic centimeter of reagent may be poured into each ring by means of a pipette. Microscopic slides, 3-inch by 2-inch are generally satisfactory for covers. Since they are made of colorless glass, many observations may be made without removing them. When inspection of a particular spot is to be made, it is a simple matter to absorb the reagent into a swab of clean cotton to examine the paint surface.

This technique for making chemical resistance tests of a paint film is not only quick and easy, but is also accurate. The wax mixture indicated is not affected by water solubles, common acids or alkalies. Concentrations can be controlled by means of the seal and all notations on reagent, film, time and results can be recorded beside the ring on the panel. These panels may be kept for reference or observation at any time; all in all a simple, inexpensive and accurate method adaptable as standard laboratory practice.



This shows how rubber rings are mounted on the painted panel and the corrosive agent applied inside the ring, permitting tests of several reagents on a single panel

Marketing Durable Goods; Light on Neglected Subject

Marketing Industrial Equipment, by Bernard Lester; cloth, 307 pages, 6 x 9 inches; published by McGraw-Hill Book Co. Inc., New York; supplied by STEEL, Cleveland, for $3.50, plus 15 cents for postage; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

Design and manufacture of production machinery and its use to manufacture goods in quantity at low cost has been carried to a high degree, especially under the stress of the past few years, but distribution of this machinery in an economical way is yet to be learned, says the author. He therefore presents an outline for a study of the distribution of durable or capital goods of an engineering nature, from the manufacturer to the ultimate user. It is intended to assist those engaged in various phases of the distribution of machinery, equipment and engineering supplies, as well as students in technical and business schools.

The present volume grew out of a series of lectures at the University of Pittsburgh, starting in a small way and eventually broadening into a regular course. To give wider

distribution to the knowledge and training thus developed it was compiled into book form.

No effort is made to teach high-pressure salesmanship but rather the way is pointed to a careful analysis of product, markets and competitive distribution. Proper organization of the sales department is covered carefully and in customer analysis and sales promotion new points of views are presented.

Analysis Shows Costs of Steel Frame In 12-Room Residence at Toledo

SOME interesting cost figures are given by C. Merrill Barber, Cleveland structural engineer, on the construction of a large steel-frame house in Toledo, O. This 12-room residence with connecting garage, in the $25,000 class, was described and illustrated in the Nov. 26 issue of STEEL, and was then reported to be the largest single steel-frame house ever built.

Mr. Barber, writing in the *Engineering Experiment Station News* of Ohio State university, Columbus, O., points out that in the construction a total of 15 tons of steel was used—46.2 per cent for the wall panels, 45.7 per cent for floors and 8.1 per cent for lintels, brick fasteners and the like. The wall units averaged 3.0 pounds of steel per square foot of wall area and the floor figured at 2.84 pounds per square foot. Average weight of steel per room was 1.25 tons.

Extra Cost Not High

Although this was the first steel-frame house of this type to be erected in the vicinity of Toledo, the steel contract was let at approximately $100 per ton, including complete field erection and welding. A bid received from one of the contractors figuring the job gave an alternate price on wood-frame construction instead of the steel frame as designed, which would have meant a saving in favor of wood amounting to $900, or approximately 3½ per cent of the total cost of the house.

The accompanying table gives a detailed analysis of amounts of steel used and the costs involved.

Cost Figures on Steel-Frame House

ANALYSIS OF STEEL FRAME AND COST DISTRIBUTION

Cubage of the total house, cubic feet	53,450
Cost	$25,240.00
Cubic cost, per cubic foot	$0.47
Cubage of the garage wing, cubic feet	9337
Net cubage of the house, cubic feet	44,113
Total weight of steel, tons	15
Cost of steel	$1550 or $103.33 per ton
Cubic cost of steel	$1550.00 ÷ 53,450 = $0.029 per cu. ft.
Main house portion	$1451.50 ÷ 44,113 = $0.033 per cu. ft.

FLOORS:

First	1367.7 sq. ft.—	3200 lbs. @ $86.85 ton—	$138.96 ($0.101 per sq. ft.)
Second	1546.6 sq. ft.—	6200 lbs. @ $86.85 ton—	269.24 ($0.132 per sq. ft.)
Garage	510.0 sq. ft.—		
Third	1396.6 sq. ft.—	4300 lbs. @ 116.17 ton—	249.17 ($0.179 per sq. ft.)
	4820.9 sq. ft.—	13,700 lbs.	$657.37
Average	2.84 lbs. per sq. ft. and $1.36 per sq. ft.		

WALLS:

Interior	1622.5 sq. ft.		
Exterior	2995.2 sq. ft.		
	4617.7 sq. ft	13,850 lbs.	$804.70
Average	3.0 lbs. per sq. ft. and $0.174 per sq. ft.		

LOOSE LINTELS AND CLIPS:

(700 + 250) @ $89.32 ton	$42.43	
(1500) @ $60.00 ton	45.00	
	$87.43	87.43
		$1550.00

STEEL COSTS:

Erection	13.78 tons @ $26.85—	$370.00
Material cost and shop work		
First floor	3200 lbs.	
Second floor	6200 lbs.	
Loose lintels	1500 lbs.	
	10900 lbs. @ $60.00 ton—	$ 327.00
Third floor	4300 lbs.	
Beam loose lintels and clips	950 lbs.	
Walls	1380 lbs.	
	19100 lbs. @ $89.32 ton—	$ 853.00
		$1550.00

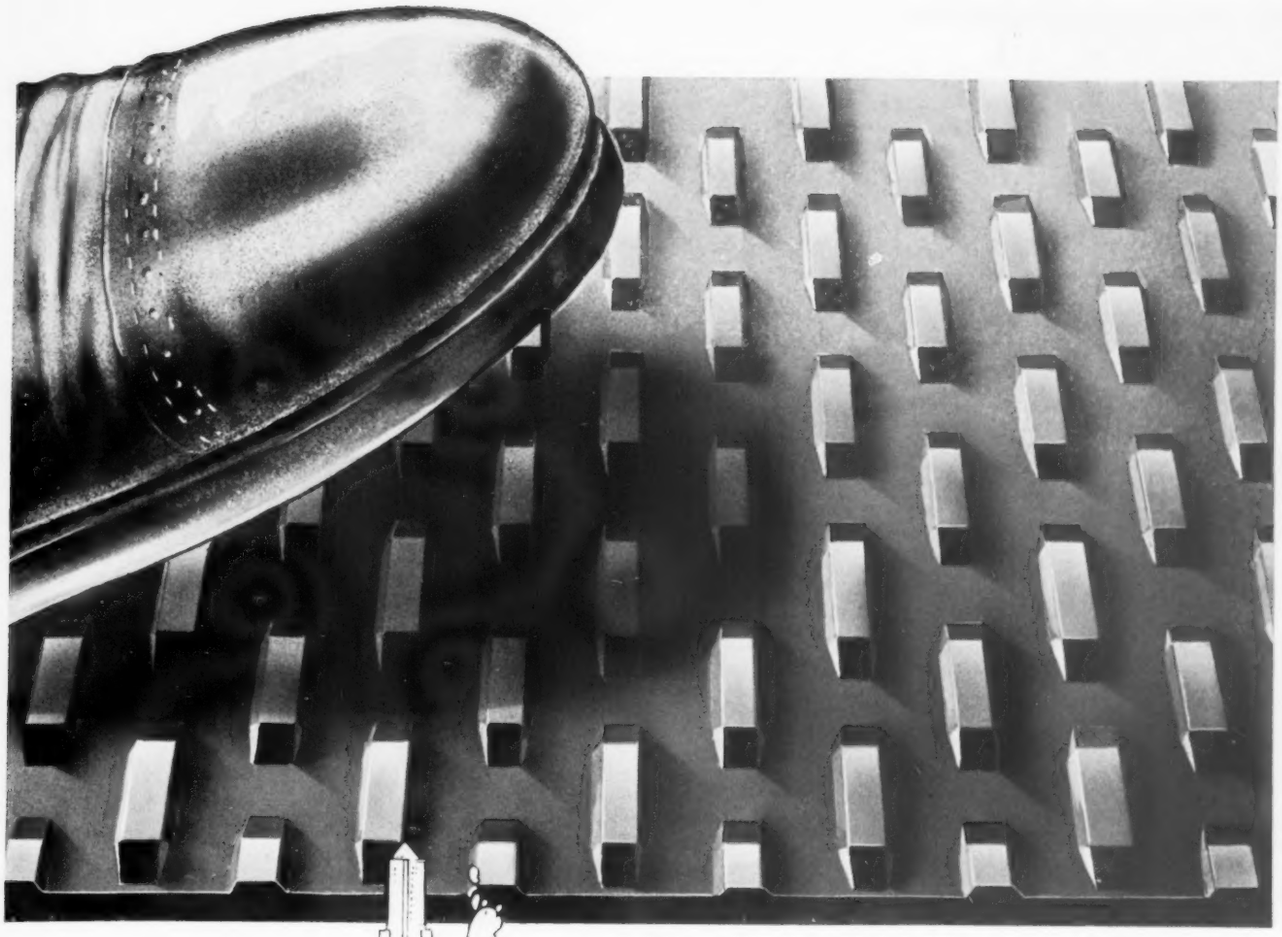
Garage wing (without sewing room):

Floor beams and bearing plates, pounds	1546
Beams and plates over garage door openings, pounds	701
Total, pounds	2247
Cost of steel: 1537 lbs. @ ($60.00 + $26.85) ton	$66.79
710 lbs. @ $89.32 ton	31.71
	$98.50
Cubage of garage, cubic feet	9337
Cubic cost of steel for garage, per cubic foot	$0.0106

Rubber Substitute Resists Oils, Light, Acids, Heat

A new plastic material, said to be superior to rubber for the manufacture of a wide variety of products, has been developed by the research departments of the B. F. Goodrich Co., Akron, O. This material may be molded into any shape, resists the action of various chemicals injurious to rubber and possesses even greater flexing life than rubber, according to J. W. Schade, director of research of that company. At present the prohibitive cost of manufacturing this product, known as Koroseal, precludes its adoption as a general substitute for rubber but it is held to be economical for certain specialized applications. The new product, for instance, resists swelling when exposed to many oils and greases and it resists corrosive chemicals such as chromic acid and hot concentrated nitric acid. The new material is also held to be ideal for use as piston packing because of the tight seal afforded by it in the presence of oil.

By variations in compounding methods the new material may be made in any consistency from hard to soft. In extremely soft consistencies it has been found useful for molding ornamental plaster casts. The new product is said to offer great resistance to moisture, to light and oxidation and to possess stability over a wide temperature range.



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Wherever a hazard for the feet of your workers exists, it can be practically eliminated at little cost by the use of Carnegie Floor Plate . . . Write for widths, thicknesses, and other information.

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301

CARNEGIE FLOOR PLATE

USS COPPER STEEL

The New Name for TENNESSEE *Copper Steel*

EFFECTIVE immediately, our copper steel sheets will be designated as USS Copper Steel and, in addition to our standard brand, will carry the USS Copper Steel trade mark.

Here is shown the complete brand exactly as it will appear on our galvanized sheets. The wording in the lower panel of our standard trade mark will, of course, be varied in accordance with the style, finish and grade of sheet on which it is used.

As heretofore has been the case with all of our standard copper steel sheets, USS Copper Steel quality will carry a minimum copper content of .20%, which exhaustive experiments have established as producing the practical maximum efficiency in rust resistance for copper steels.

In your future orders for copper steel sheets, may we suggest that you specify our new brand name, noting that the product will be clearly and unmistakably designated by the USS Copper Steel symbol placed above our standard brand as indicated. This will constitute a distinguishing mark which will stand for a superior grade of copper steel sheets, offering the highest resistance to corrosion in copper steels. Look for it when purchasing rust resisting products.

Please remember—the Tennessee brand is used in connection with all of our sheet steel products; the USS Copper Steel Brand is added when this grade is specified.

Write for booklet giving complete information.

TENNESSEE COAL, IRON & RAILROAD CO.

General Offices: Brown-Marx Building, Birmingham, Ala.
District Offices in Principal Cities

USS Copper Steel also produced on Pacific Coast by
Columbia Steel Company, San Francisco, Cal. . . . Keystone Copper Steel produced by American Sheet and Tin Plate Company, Pittsburgh

Export Distributors: United States Steel Products Company, New York

United States Steel Corporation Subsidiaries

LARGE USES OF STEEL IN SMALL WAYS

279th Article ◆ Brake Lining Tools

AMONG the tools used in every automotive service garage are brake lining appliers. All of these are made almost entirely of steel, accounting for a substantial tonnage in the aggregate. Representative of such tools is an improved brake lining applier for internal type brake shoes shown in the accompanying illustration. This tool is designed for high speed application of molded or woven lining from cut lengths or rolls and for forcing it tight to the brake shoe. It is made of steel to give assurance against breakage. All parts are cadmium plated to protect against corrosion.

The extending side arms and connecting center piece are blanked out of 11-gage mild steel sheets and annealed. They then are formed, drilled and tapped, following which they are given a case hardening treatment. The hook holder is of square cold-rolled stock and its manufacture entails two separate milling machine operations besides the drilling and tapping of the center hole. Two sets of hooks, long and short, are provided; they are stamped from ¼-inch cold-rolled stock and carburized.

The flexible band which holds the lining against the brake shoe is made of long terne sheet and is blanked and formed through die operations. The cross piece guiding the hooks is made of flat cold-rolled steel and riveted to the flexible band. The threaded screw is round cold-rolled steel and that portion which passes through the hook holder has a ½-inch diameter threaded portion while the lower end has a ⅜-inch threaded portion. Two hardened splined washers are locked together for attaching the screw to the center piece connecting the two side jaws. Although light wear develops at this point, a nut provides an adjustment to take up the wear. The hand wheel for tightening is the only casting used in the manufacture of this tool.

This is but one of many tools used in applying brake linings, both to internal and external type brake shoes. While they do not weigh much per unit, their manufacture requires a large tonnage of steel in the aggregate.

—Star Tool Co., Minneapolis

Tool for high speed application of lining to internal-type brake shoes. Chiefly of steel, the device is cadmium plated for corrosion resistance

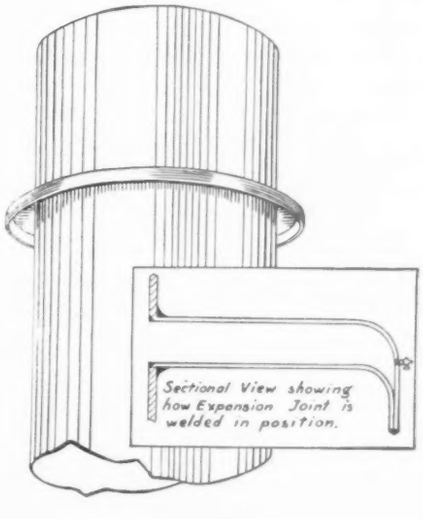
Flanged Expansion Joint for Pipeline

AN INGENIOUS method of providing for expansion in a long pipeline has been provided in the air duct just completed for the Milwaukee sewage disposal plant at Jones island, with flanged connections which permit enough flexibility to prevent distortion of the pipe under longitudinal stresses.

This large installation, comprising a tube of stainless-clad steel, ranging from 2 to 5 feet in diameter, was assembled at the island in 54-foot lengths where it was welded into a continuous tube 1800 feet long.

Inasmuch as the tube carried 100,000 cubic feet of air per minute under a pressure of 10 pounds per square inch, perfectly welded joints were imperative to prevent leakage.

The new type of expansion joint, made under patents held by the Allis-Chalmers Mfg. Co., Milwaukee, is placed at intervals of 54 feet. The flange, or collar, protrudes from the outer edge of the pipe from 4½ to 6⅝ inches, depending upon the variable diameter of the tube. As shown in the accompanying diagram, the pipe connections themselves are separated by 1 inch of air space, amply allowing for expansion and contraction under the most severe temperature changes.



New type of flanged expansion joint installed at 54-foot intervals in new 1800-foot stainless clad steel air duct at a sewage disposal plant in the middle west. The pipe varies in diameter from 2 to 5 feet

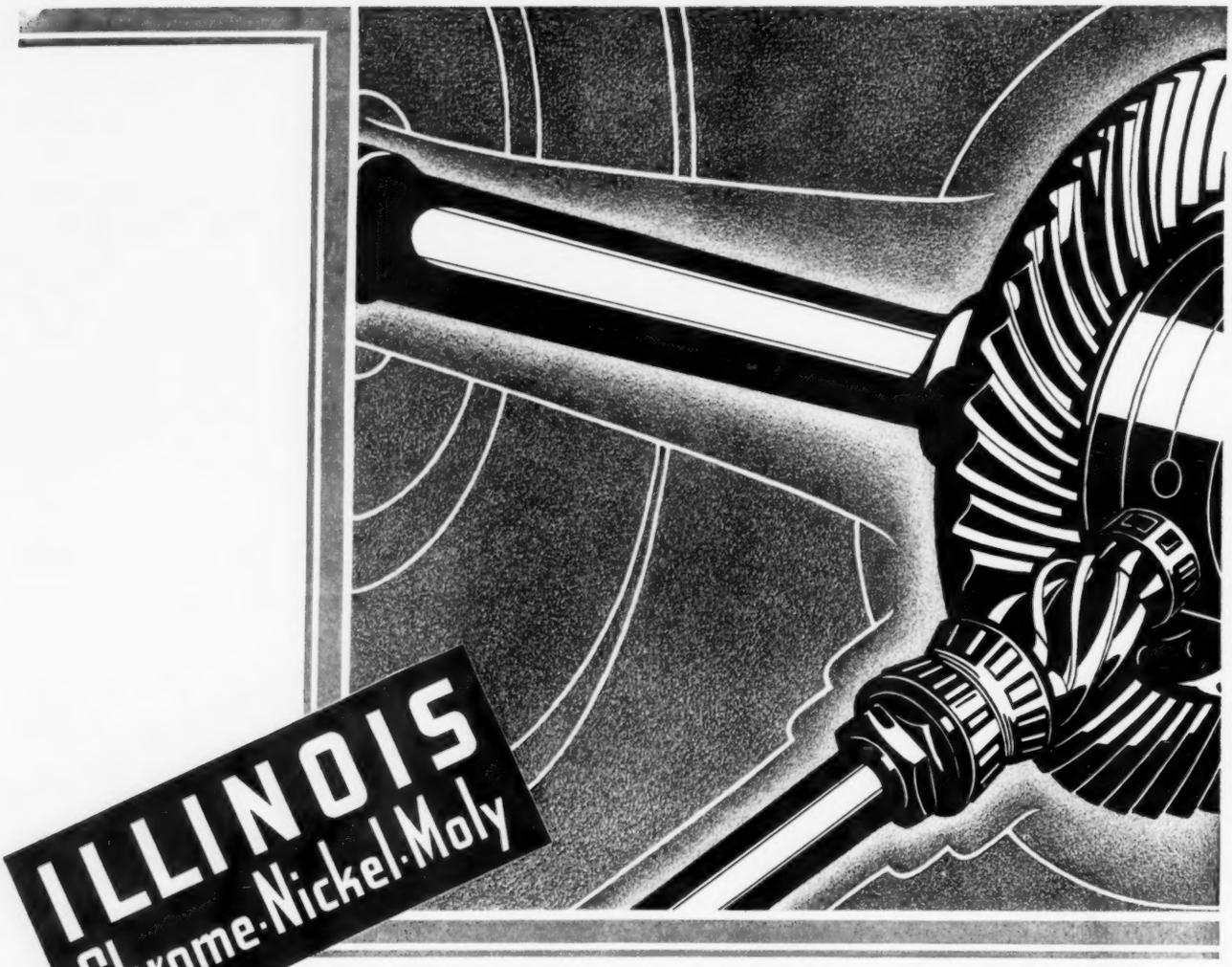
Need of Iron-Free Chemicals Promotes Use of Nickel

Producers of caustic soda and of phenol, both of which are especially susceptible to contamination by most metals, were among the most important users of nickel and nickel-clad steel during 1934, according to the annual sales summary of the International Nickel Co., 67 Wall street, New York.

Increasing demands also came from producers of alum, especially for paper making, another field in which protection against iron contamination is essential. One of the largest manufacturers in this field employs monel metal for crystallizers, agitators, conveyors, chutes and centrifuges. Another has found nickel-clad steel particularly satisfactory for floor molds on which blocks of alum are cast.

Short-Length Bronze Bars

A short-length service in semifinished bronze bar stock has been established by the Magnolia Metal Co., Elizabeth, N. J. In addition to standard lengths of 12, 13 and 14 inches, this product now is available in any assortment of sizes and lengths up to 7 inches outside diameter and from 2 to 14 inches long. The service is intended to prevent loss of butt ends by consumers. This bronze contains 80 per cent copper, 10 per cent lead and 10 per cent tin.



WHERE TORSIONAL STRESSES RUN HIGH

FOR axles and shafts requiring high torsional strength, Illinois is producing a Chrome-Nickel-Moly steel that has achieved notable successes. This steel has an unusual capacity for absorption of torsional stresses. Hence, failures are rare.

Chrome-Nickel-Moly, despite its superior physical properties, presents no unusual machining difficulties.

For trucks and bus axles, jack shafts on power excavators and cranes, and for many applications where additional strength is required without a corresponding increase in the size or weight of a shaft, it will pay to investigate Illinois' Chrome-Nickel-Moly.

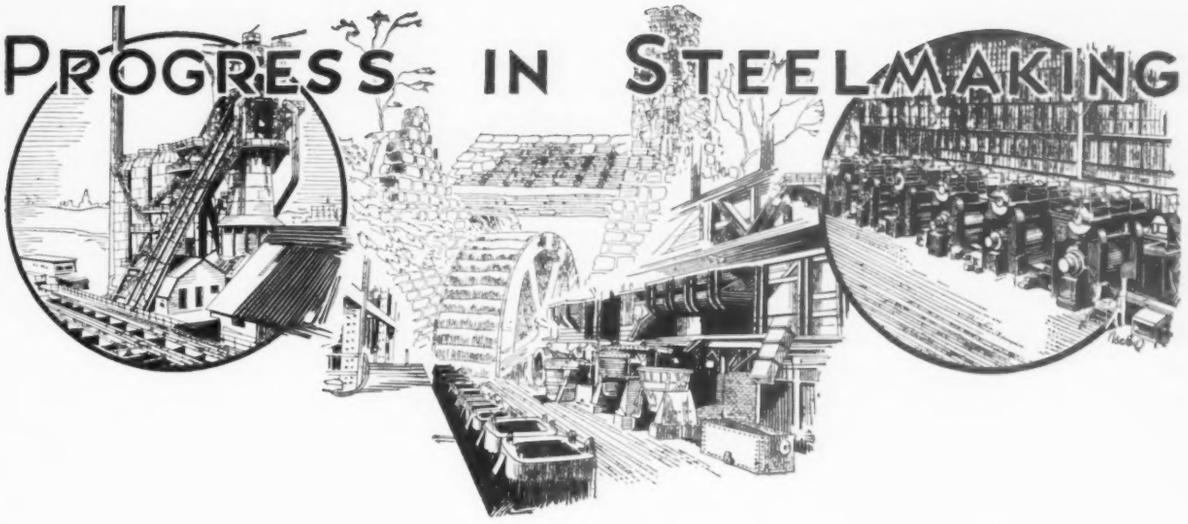
Additional information will be sent upon request.

ILLINOIS STEEL COMPANY

208 SOUTH LA SALLE STREET, CHICAGO, ILLINOIS

United States Steel Corporation Subsidiary

PROGRESS IN STEELMAKING



Doors Repaired by Welding

Open-hearth furnace doors and frames now are being repaired successfully by the use of oxyacetylene cutting and welding. Only the damaged area needs to be cut away as the patch can be cut to any shape and size; welding the patch in place completes the operation. The door or frame then is tested for leaks and washed out thoroughly before being placed in storage for future use. A low-carbon welding rod applied with the torch gives the best results. The plates used in the manufacture and repair of these furnace parts are of low-carbon steel. As a result the finished door and frame practically have a homogeneous metallurgical structure throughout.

• • •

Steel Is Cut with Arc Saw

Cutting spring steels, tool steels and even the hardest carbides or overlayed steels now can be accomplished with ease by a new electric arc saw. The chief advantage in utilizing this method of cutting steel, iron or alloy metals, aside from economy, consists in the fact that neither hardness of material nor analysis may be taken into consideration. In operation, an electric arc formed between the teeth of a rapidly rotated saw blade and material to be cut, heats the metal directly in the saw's path to a plastic or molten stage so that the pressure created by the saw blade can clear the metal from the scarf. Because of the rotating blade and other principals in construction, the electric arc is concentrated on the material directly in front of the teeth. Since the speed of travel through the material to be cut is high, the arc is concentrated at any given point for only a short period of time. Either a direct-current welding generator or an alternating-current welding transformer may be employed to generate the arc between the saw and the work.

Will Minimize Power Requirements

READY FOR INSTALLATION: Twenty-three of the 1400 Timken tapered roller bearings, which will be used in the new Ford broad strip mill, are shown here ready for shipment. Fifty-two bearings of this size (25½ x 40½ inches), each weighing 4086 pounds, will be installed on the backup roll necks of the 21 and 46 x 56-inch 4-high hot strip mills and on the back-up roll necks of the 18 and 46 x 56-inch tandem cold strip mills. The loads on the backup roll necks of the 20½ and 56 x 84-inch single stand reversing cold mill will be carried by four similar 30 x 47-inch bearings. In all, 185 tons of Timken bearings will be used in the new Ford mills. It is believed that this is the largest single order for steel mill antifriction bearings ever placed

• • •

Motors Are Synchronized

Motors for driving the pinch rolls at the entry and exit end of continuous pickling machines are held in synchronous operation by a rider roll immersed in the pickling bath.

• • •

Increases Bearing Life

Centralized lubrication of the roller tables serving a blooming mill has effected an increase in the bearing life of 600 per cent and a reduction in the power consumption of 25 per cent.

• • •

New Bolt May Be Driven

Holding or attaching anything to concrete, brick, stone and other solid masonry is facilitated by a newly devised one-piece expansion bolt which drives like a nail. When the bolt is driven in place the bow sides are

compressed back to their original positions and the tension thus secures and grips the sides of the hole like a vise.

• • •

Affords Different Ranges

Unlimited life of the piston type pressure measuring instrument used at many plants in this country for testing pipe hydraulically, has been effected by redesigning the unit. Cylinder and pistons now are interchangeable thus permitting different ranges to be elected at will.

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Changeover Effects Saving

Changing all forge-hammer operations from steam to compressed air at a forge plant in the Pittsburgh district has resulted in an annual saving of about $8000. A 350-horsepower synchronous motor-driven compressor was installed to supply the air at 100 pounds pressure to seven hammers with a total hauling weight of 16,700 pounds. The cost of the installation was approximately $17,000, including labor, compressor and other materials. Under former practice steam for the hammers was supplied by two 300-horsepower stoker-fired boilers. While certain operating advantages have resulted from the replacement, the principal advantage is the difference between the cost of air and steam. Cost of air operation including electric power, fixed charges (14 per cent), repairs and maintenance and water amounted to $8118. Steam operation, including repairs and maintenance, water, labor and coal amounted to $16,032. Costs are based on similar operating conditions.

• • •

Resin Prevents Carryover

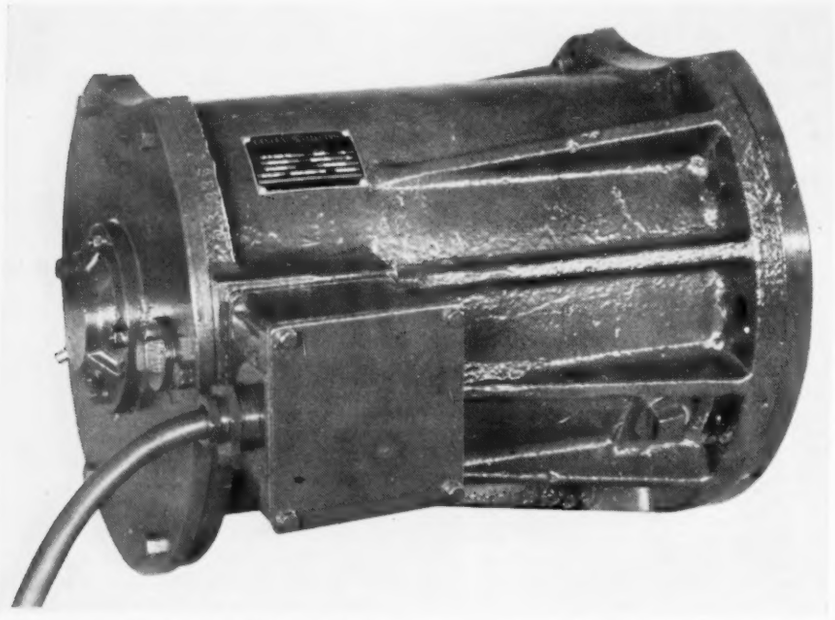
Black spots on wire can be avoided by mixing a small amount of resin with charcoal in the header box. This prevents the charcoal coming through the die with the wire being drawn.

Special Induction Motors Are Employed To Drive Hot Strip Mill Coilers

BY T. R. RHEA
General Electric Co., Schenectady, N. Y.

COILER motors installed at the finishing end of a modern hot strip mill are subject to a severe duty cycle in the presence of water, dirt and high room temperature. Special motors, therefore, are necessary and their construction and manner of control required to meet the needs of this application are unique.

On a broad hot strip mill now under construction, ten coiler motors built by the General Electric Co., Schenectady, N. Y., are provided, each rated 8 horsepower, 1200 revolutions per minute on 60 cycles and 2.7 horsepower, 400 revolutions per minute on 20 cycles. They are designed for flange mounting in the horizontal position, all joints being broad and red-leaded. The 3-wire tellurium compounded flexible mine cable, capable of withstanding mechanical abuse and highly water resistant, enters through a stuffing box.



Totally enclosed ball bearing induction motor for driving hot strip mill reels

Two coilers are required, each having five motor-driven rolls, the coilers taking alternate strips as they come from the mill. Acceleration, coiling, stopping and discharging take about one minute. Since the mill speed is adjustable, the coiler motors must have a corresponding range of adjustable speed, and this is provided by operating them on a special adjustable-frequency circuit. This alternating-current power is provided for the two coilers by two direct-current adjustable-speed motor-driven alternators.

How Control Functions

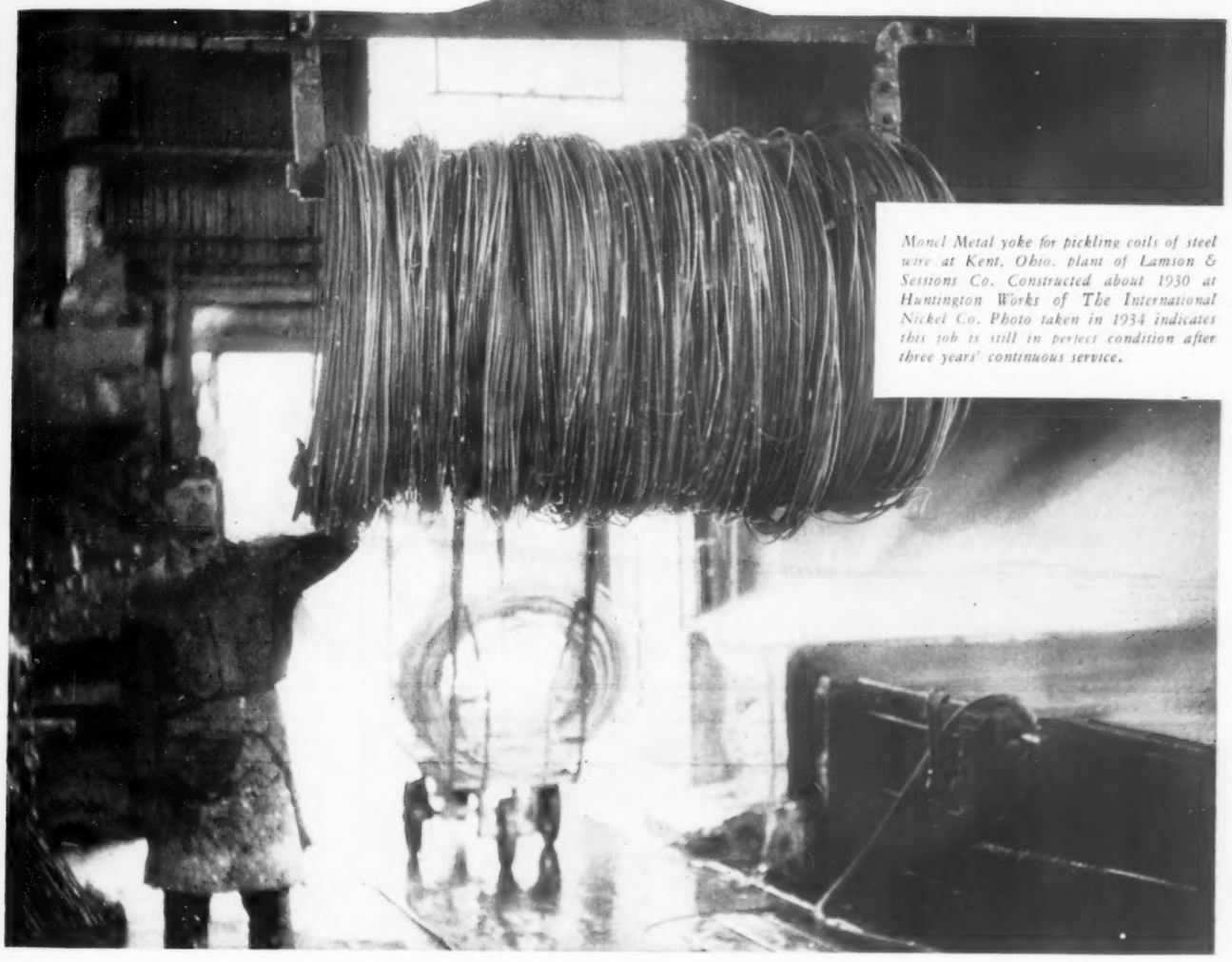
The control sequence is simple. When the coiler motors are at rest, the motor-generator set is also at rest. After the coil is discharged, the set and the connected coiler motors are brought up quickly to speed by overexciting the alternator field, removing resistance by steps from the direct-current motor armature circuit, and finally by weakening the motor field. Upon completion of acceleration, the alternator field current is reduced to normal.

When the strip enters the coiler, the load increases throughout the system and the alternator field is again "forced" automatically to hold the voltage up. Upon completion of the coil, the set is reduced to the full-field motor speed and a resistor is connected across the three phases of the alternator to absorb the stored energy of the coiler.

The coiler motors are disconnected from the alternating-current circuit and direct current is applied to their stators which dynamically brakes them to a quick positive stop without drift or reversal. The direct current automatically is removed after the predetermined time. In the meantime, the set has been brought to rest by dynamic braking on the direct-current driving motor. The coiler motors now are reconnected to the alternator circuit, ready for the third step, the second having been coiled in the meantime by the companion coiler.

The purpose of the frequency system of acceleration is to relieve the motor of most of the heating that results from acceleration and deceleration, such heating being largely taken by the set and exterior resistance. Otherwise, the motor would need to be much larger in a location where space is at a premium.

Get a LIFT with Monel Metal ...it never lets you DOWN



Monel Metal yoke for pickling coils of steel wire at Kent, Ohio, plant of Lamson & Sessions Co. Constructed about 1930 at Huntington Works of The International Nickel Co. Photo taken in 1934 indicates this job is still in perfect condition after three years' continuous service.

Conveyors and suspension members of rolled and forged stock display strength that is unfailingly uniform

YOUR past experience has undoubtedly already proved to you that strength in pickling equipment is not enough. Strength must be *uniform* if equipment is to stand the test of service.

Rolled and forged shapes of Monel Metal are remarkably uniform... in strength, in stiffness, and in their resistance to impacts which are incidental to pick-up and movement by crane.

In addition, Monel Metal is noted for its resistance to pickling and cleaning baths, both acid and alkaline. The high nickel content of Monel Metal minimizes any tendency towards objectionable copper flash.

Write for information regarding any particular condition you may face in your plant. INCO engineers are on call for consultation and advice.

• • •

THE INTERNATIONAL NICKEL COMPANY, INC.
67 WALL STREET NEW YORK, N. Y.

Monel Metal is a registered trade-mark applied to an alloy containing approximately two-thirds Nickel and one-third copper. Monel Metal is mined, smelted, refined, rolled and marketed solely by International Nickel.

NRA CODE

MONEL METAL

Hot Strip Steel Is Coiled During Cycle of Rolling

BY JOHN D. KNOX
Associate Editor, STEEL

STEEL strip now is being hot rolled on a new type mill, the first to be operated in this country on a commercial basis. The layout includes a stand of edging rolls and a 2-high 20-inch reversing mill. The difference between this mill and any other 2-high reversing unit is that it is served by two fuel-fired heating furnaces, one spanning the front mill table and one the back mill table, each spaced about 18¾ feet from the center line of the rolls. A power-driven reel operates within each furnace and winds the strip into a coil during reduction. By this arrangement the strip during the rolling operation is maintained at a uniform temperature.

At the outset the mill is operated as a conventional slabbing mill, the slab being passed back and forth between the rolls until it has been reduced to a thickness suitable for coiling. At this stage the end of the strip is canted into the furnace, taken by the reel and wound into a coil. This procedure continues until the specified thickness is obtained, the strip passing back and forth through the rolls and from one furnace to the other.

Located in Detroit

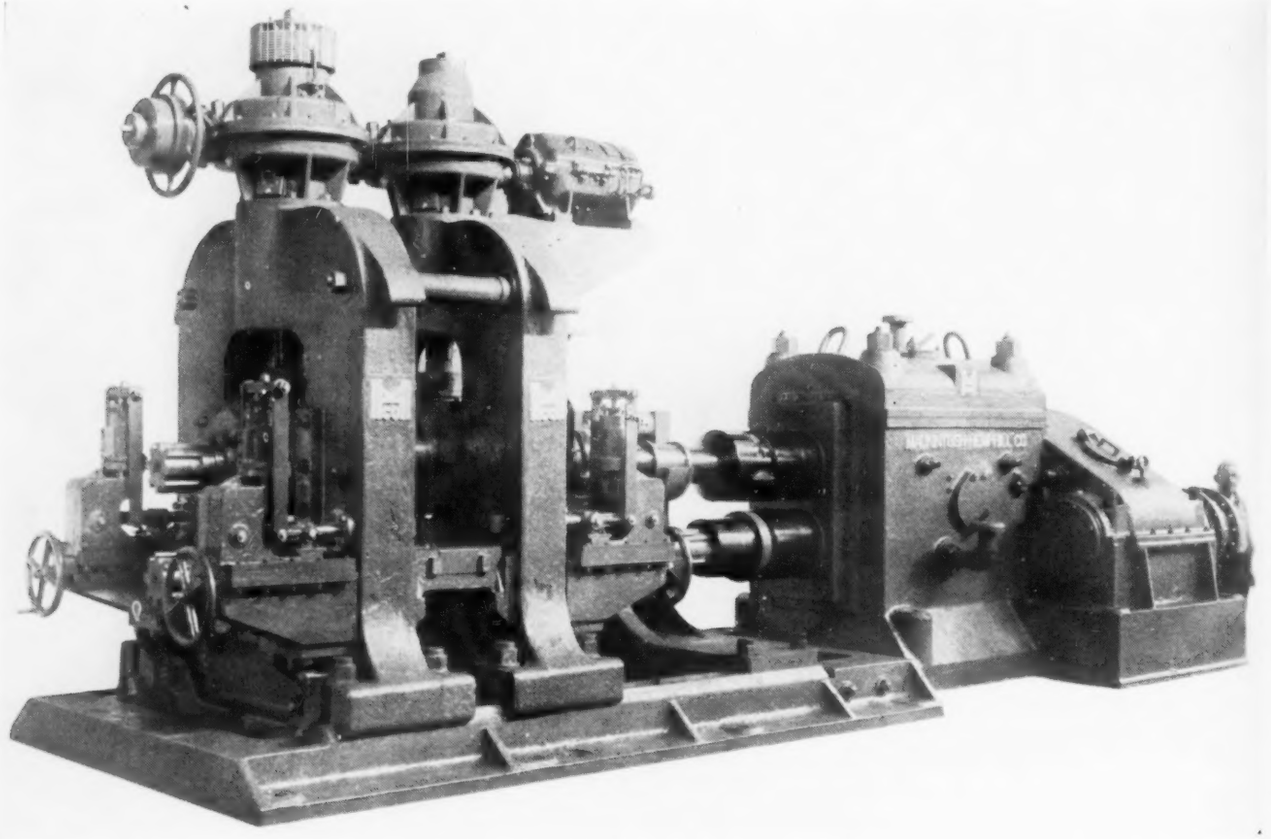
The new mill recently was placed in operation by the McLouth Steel Corp., Detroit, under a license agreement with the Cold Metal Process Co., Youngstown, O. The mill was built by the Mackintosh-Hemphill Co., Pittsburgh.

A heated slab is delivered onto the mill approach table by a set of pinch rolls which is an integral part of the roller table in that the first roller at the heating furnace end of the table forms the lower roll of the pinch rolls. These are carried in housings attached to the table beams. The table rollers, 12 inches diameter, 20 inches long and spaced on 4-foot centers, are driven through bevel gearing by a 35-horsepower motor. With the motor operating at 600 revolutions per minute the peripheral speed of the rollers is 875 feet per minute.

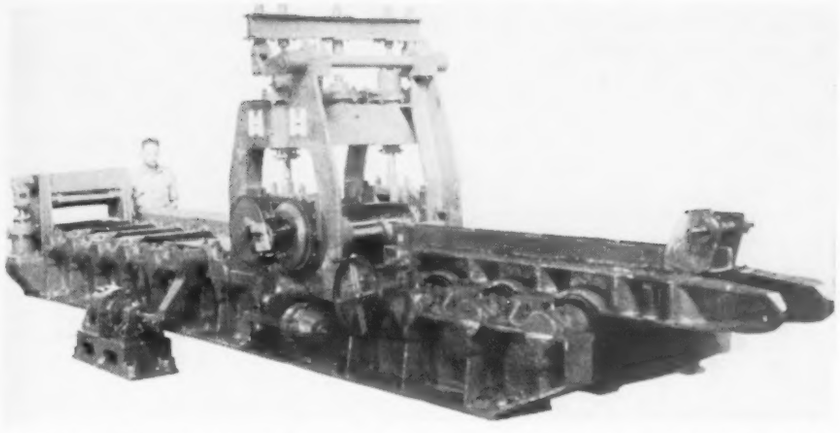
Slab Given Edging Pass

About 75 feet from the heating furnace the slab enters a vertical edging mill which is actuated by a 100-horsepower motor at 475 revolutions per minute through an independent completely enclosed reducing drive. The rolls have a pass diameter of 12½ inches and are turned with necks 7 inches diameter and 9 inches long for mounting in bronze bushings. The rolls are power adjusted by twin screws, a large dial indicating the pass opening, which ranges from 16½ inches maximum to 4¾ inches minimum. A pinch roll attachment is incorporated in the table to control the vertical alignment of the partially rolled strip in the edging pass.

From the edging mill the slab progresses about 16 feet into a stand of pinch rolls of the duplex type equipped with two pairs of 12-inch diameter rolls, 20 inches long. The lower rolls are an integral part of the table and also serve to drive the mill table rollers. A system of air



Two-high, 21½ x 20-inch reversing hot strip mill. The unit is served by guides which act alternately as entering and receiving guides. The rolls are driven by an 800-horsepower motor through a stand of pinions and a gear reduction set incorporated with the pinion housing



Stand of 12-inch pinch rolls and front mill table. A similar installation is located on the opposite side of the 2-high reversing mill

cylinders is employed for raising and lowering the upper rolls and for maintaining the driving pressure between each set. A set of trip rollers incorporated in the mechanism serves to automatically reverse the direction of rotation of the pinch rolls and mill table.

The pinch rolls are driven through a combination reduction gear set and pinion stand by a 35-horsepower motor. The lower pinch rolls and table rollers are driven through a floating shaft-type flexible coupling. One uper roll is actuated through a universal coupling spindle; the second upper roll is actuated through a sprocket and chain from the first upper roll. The latter drive is friction controlled by springs and friction disks. A similar electrically-driven stand of pinch rolls is disposed on the opposite side of the mill.

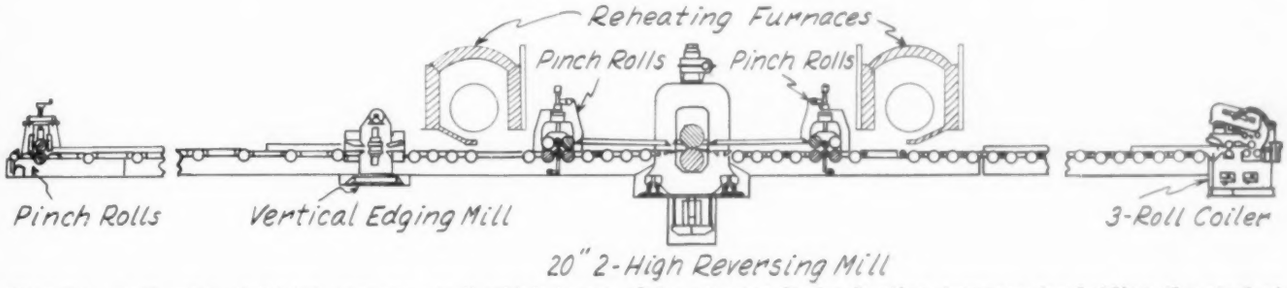
Equipped with Roller Bearings

Approximately 12 feet from the pinch rolls the slab enters the 2-high reversing mill, which is equipped with rolls 21½ inch maximum diameter on body and 20-inch face. The periphery speed of the mill based on this roll diameter ranges from 430 to 935 feet per minute. The roll necks, 10½ inches diameter, operate in roller bearings. The bottom roll is driven through a machined splined spindle and coupling boxes; the upper roll, which is balanced by counterweights located beneath the housings, is actuated through a universal coupling spindle. The spindles are connected through a stand of mill pinions and gear reduction to an 800-horsepower, 230/500 revolution per minute variable-speed motor.

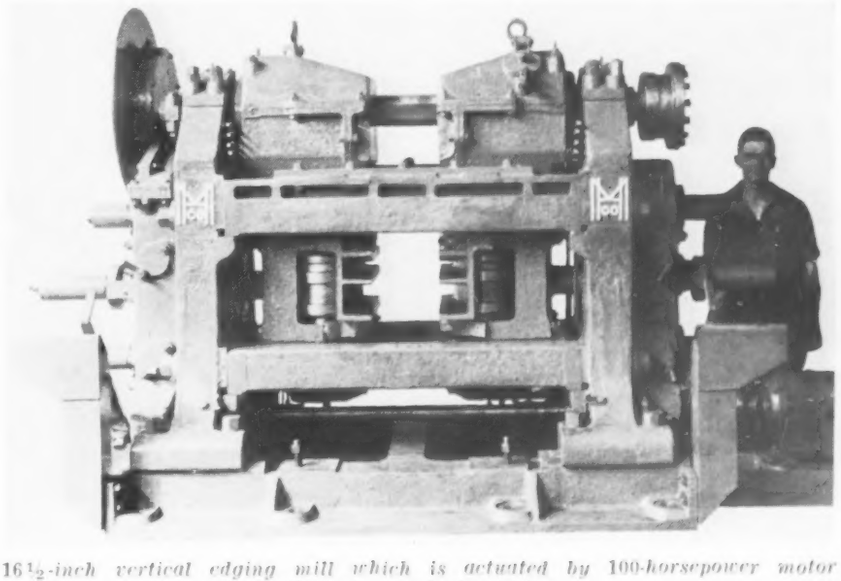
A patented feature in connection with the mill is the automatic control of the guides which alternately act as entering or receiving guides. When the slab has been rolled down to certain thickness and length by successive passes back and forth through the 2-high reversing mill, the hot strip is delivered into the heating furnaces. These are of the rotating coil type arranged about 3½ feet above the table, one on each side of the mill. Incorporated in both the front and back mill tables between the pinch rolls and furnaces is an air-operated tilting section which when elevated leads the strip into the furnace.

Motor Speeds Vary

The speeds of the motors driving the reels increase and decrease as the speed of the 800-horsepower motor driving the mill changes; they also are adjusted automatically to compensate for the increasing diameter of the coil on the winding reel and for the decreasing diameter of the coil on the unwinding reel on the opposite side of the mill. The control functions so that there is no appreciable tension on the strip and no tendency for the strip to buckle during reduction. When the mill motor reverses, the reels, pinch rolls and front and back mill tables reverse. Moreover, the speeds of the



Elevation of the 20-inch 2-high reversing mill which is served by two gas-fired reheating furnaces for holding the steel at uniform rolling temperature



16½-inch vertical edging mill which is actuated by 100-horsepower motor through a reducing drive

pinch rolls and front and back tables are kept in synchronism with that of the main motor.

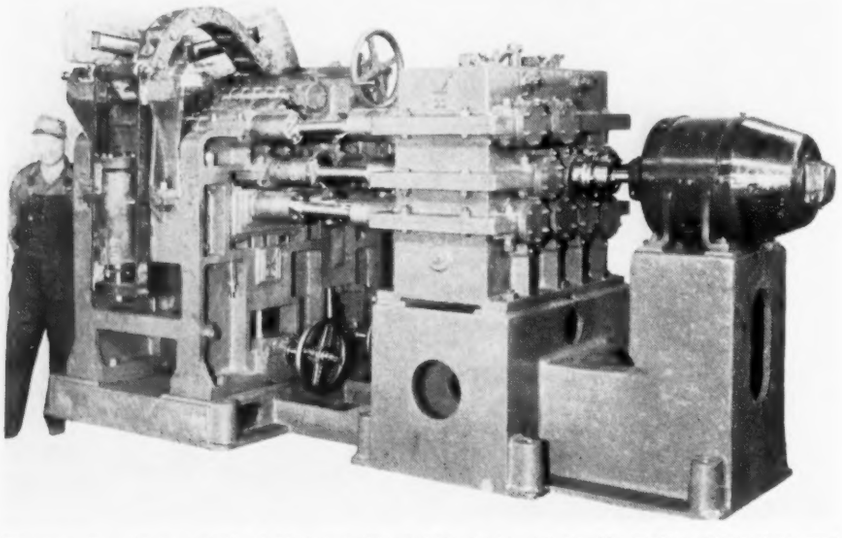
When the strip has been reduced to the specified gage it is conveyed by the runout table to a coiling machine located about 86½ feet from the mill. This table, as well as the mill approach table, is built with rollers 12 inches diameter and 20 inches long which are actuated by a 35-horsepower motor at a periphery speed of 875 feet per minute. The side guides are hand adjustable through screws and chain from a maximum width of 16 inches to a minimum width of 6 inches.

The coiling machine located at the end of the runout table is a 3-roll unit which is built with a pair of pinch rolls, and three bending rolls, each 7¼ inches diameter; and two coiling rolls of 5½ inches diameter—all rolls in the unit being 20 inches long. The upper pinch roll and upper bending roll are non-adjustable. The lower pinch roll and the two lower bending rolls are adjustable by hand-operated worm, worm wheel and screw.

Arrangement of Guide Rollers

An overhead pivoted framework carrying seven guide rollers operates in conjunction with the two coiling rolls; this frame is swung clear of the coil by means of an air cylinder to permit coiled stock to be removed. Substantial side guides equipped with long rollers are mounted adjustably on a heavy base which spans the two roll housings. The seven pinch, bending and coiling rolls are driven by individual universal coupling spindles from a totally enclosed system of spur gears which are coupled to a 15-horsepower motor with a variable speed of 850 to 1700 revolutions per minute. The driving gear shafts, driven rolls and all guide rolls are equipped with roller bearings. While the machine delivers coils up to 40 inches diameter and 14½ inches wide, it is designed and powered so that it readily may be modified to handle wider strip.

During a recent trial run with the mill operating at two-thirds speed and scheduled on 12 gage strip 12 inches wide, production exceeded 10 net tons an hour.



Three-roll coiler which delivers coil of hot strip up to 40 inches diameter and 14½ inches wide

Adapt Steels to Transport Needs

STRESSING the close relationship between the steel and transportation industries, I. Lamont Hughes, president of the Carnegie Steel Co., Pittsburgh, outlined the substantial progress that is being made by steelmakers in the development of new steels for the transportation industry, speaking before the Traffic club of Philadelphia, at its recent annual dinner.

Referring to the further improved quality of rail steel, he noted that investigations have been made by the steelmaker of fully heat treated rails, of especially cooled rails, and of those containing chromium, titanium or higher proportions of manganese. The steel quality of the wheel and railway axle have kept pace with the rail. The lightweight, forged and rolled, heat treated wheel of special steel, the stronger hollow bored, heat treated axle of special or alloy steel, are examples of improved design and material in this direction, he said.

Heavier track structures are being installed. Screw spikes, heavy tie plates, better rail fastenings, longer rails, and stronger bridges of high tensile steels, are late developments. Rails have been welded together, both here and abroad, in stretches of more than one half mile in length. The results of this art are being awaited with intense interest by the railmaker and user. Hardening the top surface of the rail at the joint to reduce the wear and make an easier riding track is in the progress of development.

Freight Cars Are Improved

Reduction in weight of both passenger and freight cars, together with streamlining and air-conditioning, are problems of the present moment, Mr. Hughes declared. A lightweight freight car is now offered in which the dead load or actual car weight is but one-fifth of the carrying load. Oil tank cars are old but the use of the new enameled steel tank car for transporting milk, vinegar, beer, alcohol and other liquids, is growing rapidly. Special box cars for finely powdered bulk materials, such as cement, flour, lime and sand, are being unloaded by suction to avoid the dust nuisance. A proposed flat car for light freight is to be equipped with an entire light metal demountable top, which converts it into a box car, or with several removable compartments, making a container car.

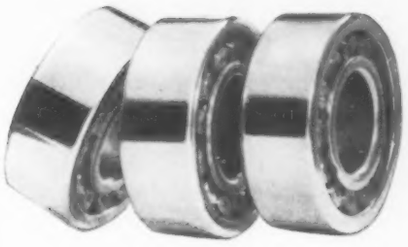
The increased use of the 100-ton capacity freight car, welded car truck of high-tensile steel, and further progress in welded construction, are but indirect methods of reducing the tonnage in cost transportation, he added.

In the manufacture and rolling of new steels, as well as in their fabrication, certain changes in practice and technic have been required. These, however, must be expected, Mr. Hughes said, and are, as in similar changes from the low to a higher strength material, a matter of manufacturing and fabricating development. Experience so far in this respect points to a practical and commercial solution of mill and shop difficulties.

Issues Progress Bulletin

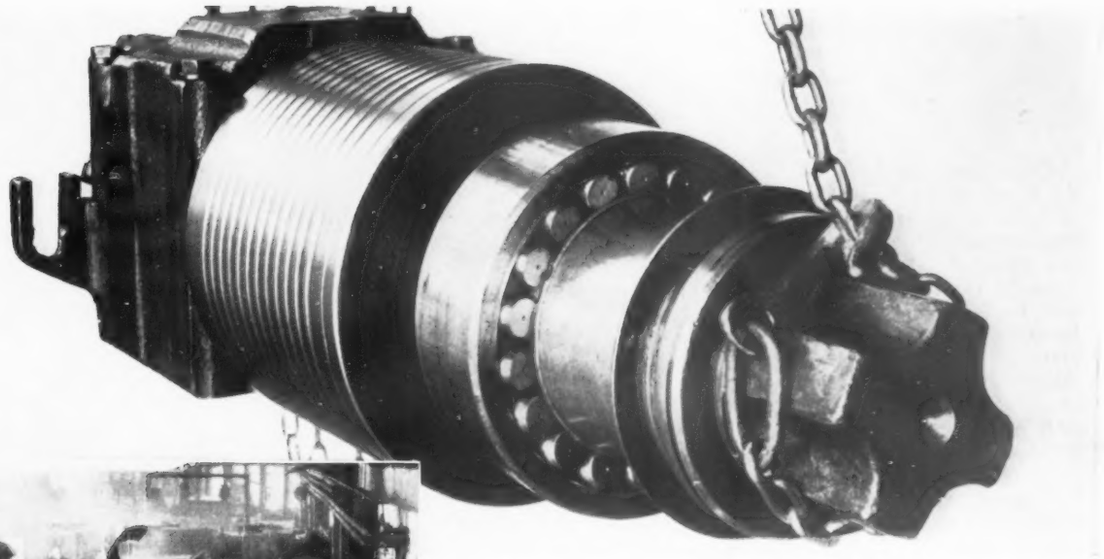
Fourth progress report of the Metallurgical Advisory board to the Carnegie Institute of Technology and United States Bureau of Mines, Pittsburgh, now is being distributed. A summary of the accomplishments of the program on the study of the physical chemistry of steelmaking, firms which have contributed financially toward the 8-year program, researches conducted, bulletins written during the period under review, and a total of 71 bulletins of the co-operative mining and metallurgical investigations are presented. A copy of the report may be obtained from John D. Beatty, Carnegie Institute of Technology, Pittsburgh.

STEEL
Men Who Want

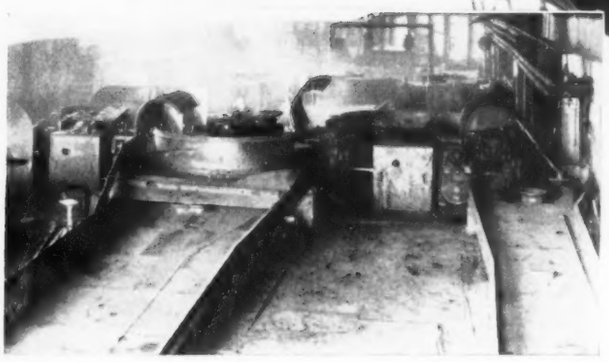


INVESTMENT VALUE

Specify SKF



SKF Self-Aligning Roll Neck Bearings installed in the 10" rod mill pictured below.



Fourteen SKF-equipped stands of 10" rod mill. Canadian Tube & Steel Products Co., Ltd., Montreal, Canada. In operation since January, 1931.

SKF Self-Aligning Roll Neck Bearings are the logical choice of men whose technical judgment is *unbiased*. The performance of 1100 SKF-equipped roll stands throughout the world proves these men are right.

SKF Self-Aligning Roll Neck Bearings provide an equalized load distribution insuring full bearing capacity and longest life. They effect substantial power saving... increased output... close tolerances. This means better rolling at lower cost per ton. Widen your margin of profit by specifying SKF Self-Aligning Roll Neck Bearings. SKF INDUSTRIES INC., Front St. & Erie Ave., Philadelphia, Pennsylvania.

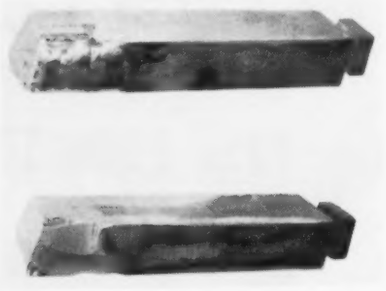
SKF
ROLLER BEARINGS

3345

NEW EQUIPMENT

PRODUCTION FABRICATION
TREATMENT FINISHING

Arc Welding Electrode—Lincoln Electric Co., Cleveland, recently announced a new arc welding electrode which is designed for restoring worn



"Toolweld" deposit on tool before grinding and after service

cutting edges on tools of all kinds. By using this new electrode, known as "Toolweld," lathe tools, bits, milling cutters, drills, cutting and forming dies, etc., which have become worn in service can be given a new and harder cutting edge than has heretofore been possible, it is claimed. Tools can be refaced an unlimited number of times with this electrode.

In a recent experiment, according to the manufacturer, a tool faced with this electrode was placed in a machine alongside a regular tool and used in turning down 20 shafts of motor generators. As these shafts contained .20 to .30 per cent carbon, they were more difficult to machine than would be the case with a harder steel.

With the tool faced with the new electrode, 14 shafts were turned to a depth of 3/16 inch, the length of cut being 15 inches. Using the ordinary tool steel, 12-inch cuts 3/16-inch deep were made on 6 shafts. In both cases, the operating speed was 117 revolutions per minute.

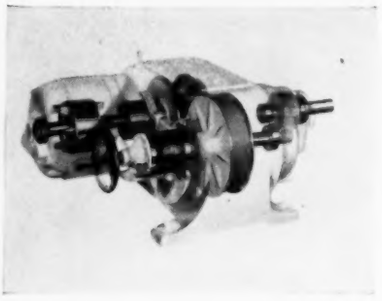
Inspection of the two tools at the end of the test showed that the one faced with the new electrode had a square, sharp edge, whereas the cutting edge of the ordinary tool steel had become rounded off. The accompanying illustration shows the deposit of "Toolweld" before grinding and the same tool at end of test.

The new electrode is made in 14-inch lengths in four sizes, 3/32-inch, ⅛-inch, 5/32-inch and 3/16-inch.

♦ ♦ ♦

Variable Speed Unit—U. S. Electrical Mfg. Co., Los Angeles, Calif., is announcing an improved development in variable speed equipment for use in the steel industry. The phantom view depicted herewith, shows the new lever arm construction developed for the larger horsepower ratings. It also depicts how the formerly separate units consisting of a constant speed motor, a variable speed device, and a gear case have been built into one compact unit at a saving in space, in addition to the economy effected due to the elimination of mounting bases and transmissions, such as couplings, fans, and belts between the component parts.

The phantom view also shows how the speed change is obtained by the micro-speed control which varies the effective driving diameter of the disks. These disks expand and contract for higher and lower speeds transmitting power through the belt to the take-off shaft. This new motor being self-contained can be conveniently direct connected to machin-



Variable speed unit improved by U. S. Electrical Mfg. Co.

ery. It provides any variation of speed, so that the driven machine can be operated at its highest capacity at the will of the operator.

♦ ♦ ♦

Hydraulic Power Unit—Ex-Cell-O Aircraft & Tool Corp., 1200 Oakman boulevard, Detroit, is announcing a self-contained, compact hydraulic power unit designed to meet modern demands for drilling, reaming, counterboring, spotfacing and similar operations.

The hydraulic power unit, shown herewith, is available in three sizes to meet the general demands for this type of unit. It can be mounted in any position either singly or in multiples and operated individually or collectively with a manual or by remote control. The small unit, No. 23, has an 8-inch stroke; the medium, No. 25, has a 10-inch stroke, and the large, No. 28, has a 12-inch stroke.

These units are adjustable for length of stroke, length of rapid traverse and length of feed. The rate of feed can be easily changed from the outside of the unit by graduated adjusting valves while the unit is feeding, permitting the selection of the most suitable feed. There are two forward feeds each independent of the other. Adjustable dogs for controlling the rapid traverse, feeds, stop and reverse of the unit, are provided.

The electrical motor is mounted on an adjustable base located above the unit proper. It drives the hydraulic pump and drive shaft by V-belts. Pump driving shaft is connected through change gears to the spindle driving shaft which at the inner end is splined and forms a sliding driver connection with the spindle of the hydraulic unit.

The quill or ram of the hydraulic unit is furnished with a mounting flange for attaching multiple spindle heads. A sight gage is provided to show the level of the oil and a pressure gage is provided for indicating the hydraulic pressure, the adjust-

IN THE new Ex-Cell-O hydraulic power unit the spindle is supported at both front and rear ends in the main quill which carries a piston that is operated hydraulically. By changing pressure at either end of the piston the main quill or ram moves forward or backward, providing the feed for the unit

EMERGENCY SERVICE

The Modern Mercury—

MOLTRUP EMERGENCY SERVICE

• Warehouse stocks of cold drawn steel are carried in all important manufacturing centers—standard sizes and shapes. Don't hesitate when you have an *emergency call* from the shop for cold drawn steel. Tell the telephone operator *"get me the nearest Moltrup Office or Warehouse."* After that let us do the worrying. Our service is "notoriously" dependable.

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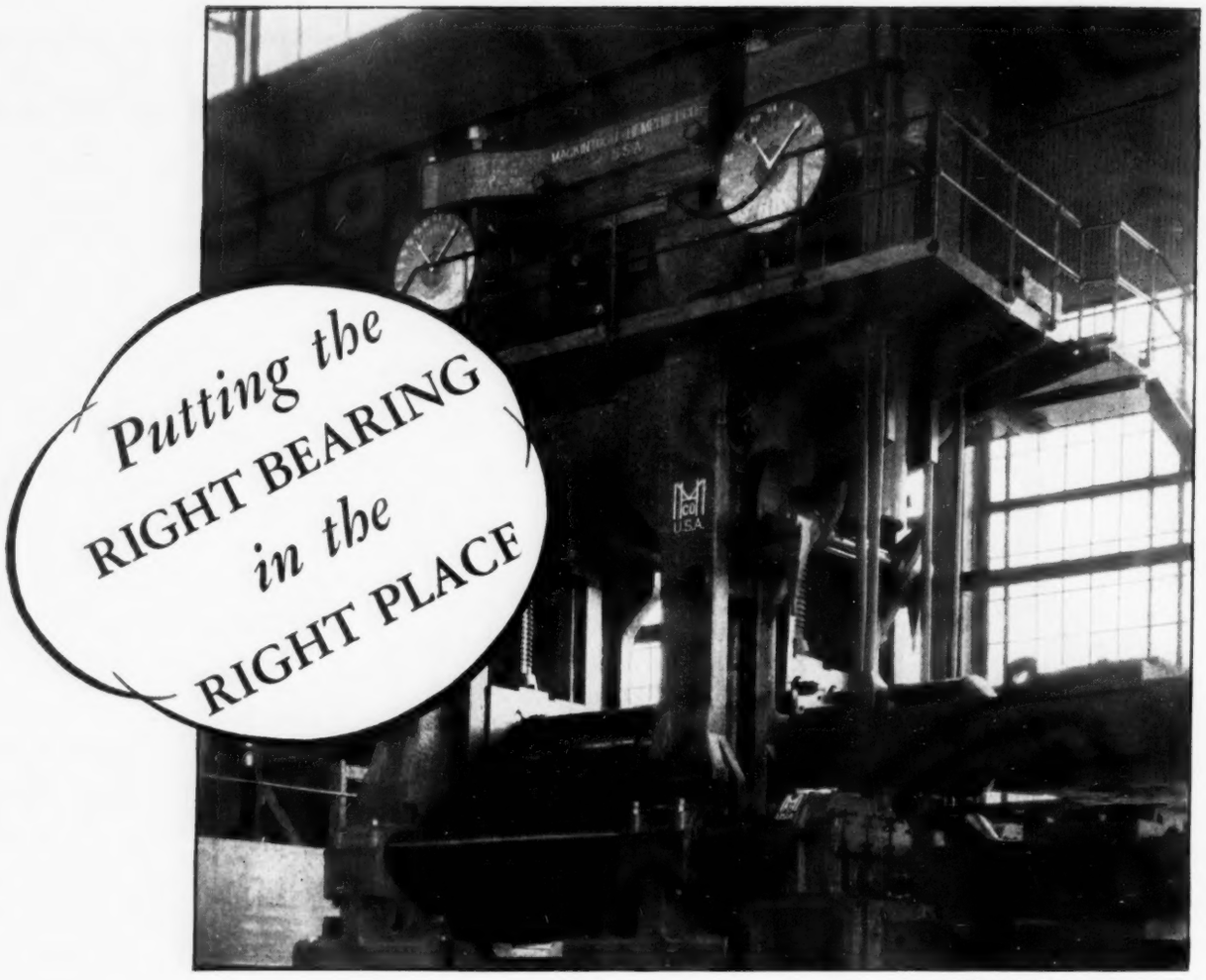


This 44-inch Blooming Mill was built by The MACKINTOSH-HEMPHILL COMPANY, Pittsburgh, for the Illinois Steel Company. Hyatt Roller Bearings are used on the feed rollers. All mill tables on this mill are Hyatt Bearing equipped.

Employed at strategic points Hyatt Roller Bearings keep things running smoothly. They are designed specifically to solve the problems of speed, load, wear and the steady grind of uninterrupted operation.

For over 40 years these better bearings have made this important contribution to the building of better mechanical equipment. And this long and successful association with the country's principal industries has enabled us to accumulate authoritative knowledge of all forms of bearing requirements.

So closely have Hyatt engineers worked with and on all kinds of machinery development that many times their help has gone farther than bearing application design. That is how and why Hyatt Roller Bearings serve so extensively and so well. Hyatt Roller Bearing Company, Newark, Detroit, Chicago, Pittsburgh, Oakland.

HYATT

ROLLER BEARINGS

PRODUCT OF GENERAL MOTORS

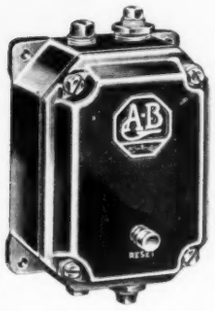
ment of which is accessible from the outside.

A machined pad is provided on each side of the unit near the front end for attaching guide bar brackets for multiple heads or jig plates. The base of the unit has two longitudinal keyways in the center for lining up the unit. The side of the base flange is so designed that it may be machined as a dovetail slide if desired.

♦ ♦ ♦

Solenoid-Operated Switches—Allen-Bradley Co., 1311 South First street, Milwaukee, has announced that type D dust-tight enclosures now are available for its bulletin 709 starters in polyphase ratings up to 15 horsepower, 110 volts; 30 horsepower, 220 volts; and 50 horsepower, 440-550 volts. These starters, shown herewith, also can be used with single-phase motors of the self-starting type.

The type D enclosure meets the



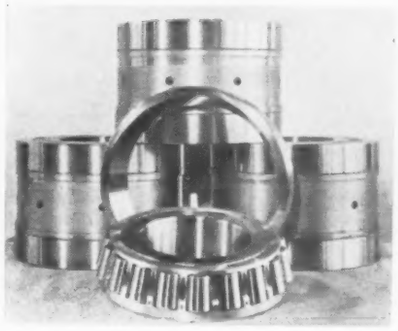
Allen-Bradley solenoid-operated switch for hazardous locations

underwriters' laboratories' requirements for class 2, group G hazardous locations such as pulverized fuel plants, etc. The enclosure is of cast iron, black enameled on the outside with a white enameled interior. The surface between the cover and base is machined, making a seal without the use of gaskets.

These switches, being of the solenoid type, are very compact in size. The double-break silver alloy contacts require no maintenance and eliminate flexible connectors.

♦ ♦ ♦

Spaghetti Tubing—George Ulanet Co., 85 Columbia street, Newark, N. J., has developed high tension and heat sealing spaghetti tubing characterized by high dielectric strength. The tubing, which is extremely tough and which will stand a certain amount of flexing, has a perfectly smooth inside wall. By using a hot pair of pliers the tubing can be pinched shut and sealed. At present, inside diameters of from 0.025 to 0.250 inch and black, yellow, red and green colors are available. If there is demand for tubing of other colors, the company will produce it.



Group of dredge pump tapered roller bearings developed by Bantam

Tapered Roller Bearings—Bantam Ball Bearing Co., South Bend, Ind., is calling attention to a group of tapered roller bearings, shown herewith, which it developed for use on 28-inch dredge pumps. These bearings are 23½-inch outside diameter, with a radial load carrying capacity of approximately 500,000 pounds at 100 revolutions per minute. Forty-eight of these bearings were required to equip the dredge pumps including spares. Twenty of these large pumps will soon be in operation building the world's largest earthen fill dam across the Missouri river at Ft. Peck, Mont.

♦ ♦ ♦

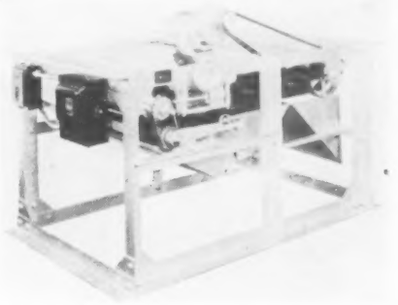
Portable Barrel Elevator — Barrett-Cravens Co., 3255 West Thirtieth street, Chicago, recently brought out a portable elevator for handling barrels. The unit, shown herewith, has a capacity ranging from 500 to 750 pounds. Platform width is 30 inches, length 30 inches, and platform height lowered is 1½ inches. A direct motor drive and an electric brake integral with the motor are features of the elevator.

Portable barrel elevator introduced by Barrett-Cravens Co.

♦ ♦ ♦

Magnetic Equipment — Magnetic Mfg. Co., Milwaukee, recently brought out a new machine capable of concentrating highly magnetic substances with the use of alternating current instead of the conventional direct current invariably necessary for energizing magnetic equipment. Where fine powdered material is encountered, having a high magnetic content of considerable quantity to be eliminated or recovered, the new type "AM" machine, illustrated herewith is especially adaptable. Any standard alternating current voltage is satisfactory for energizing the unit.

Principle of operation consists of feeding the material to a suspended type magnet located within a belt conveyor. As the mixed material is



Type "AM" magnetic separator built by Magnetic Mfg. Co.

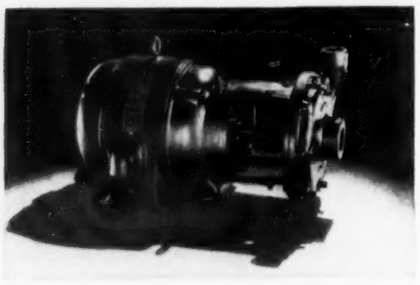
delivered to the magnetic field, the magnetic substances are lifted and carried in suspension while passing through the magnetic field, and finally discharged automatically when the belt conveyor reaches the head pulley and leaves the magnetic influence. The particular feature of the operation is the thorough cleansing of the magnetic from the non-magnetic material while in the magnetic field, the alternating current providing high agitation or pulsation, that is, at the rate of 120 cycles per second on 60-cycle current.

♦ ♦ ♦

Hoist Unit—Foote Bros. Gear & Machine Co., 5301 South Western Boulevard, Chicago, is introducing a compact hoist unit which combines a standard worm type powered gear unit with a solenoid brake mounted on the extended worm shaft and a groove drum on the slow speed worm shaft. Adaptable to many applica-

HOIST unit developed by Foote Bros. Gear & Machine Co., embodies a gear mechanism combined with a solenoid brake, motor and grooved drum

tions, the unit, shown herewith, can be furnished in any of the nine standard sizes of worm powered gears available and with any make and type of motor desired. Radiating worm type powered gears can be furnished in the horizontal type as illustrated, in vertical types or in double reduction types with the motor mounted either horizontal or vertical. A complete range of ratios are available, providing slow speed shaft revolutions from 0.55 per minute to 600 per minute. Horsepower capacities range from ¾ to 40.



Compact design is feature of new Fairbanks, Morse pump unit

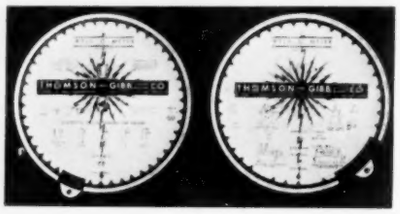
• • •

Compact Pump Unit — Fairbanks-Morse & Co., Chicago, has announced a motor and pump unit built together to conserve space and to reduce weight. This compact addition to the company's line of pumps is shown herewith. The unit consists of a centrifugal side-suction pump with a closed bronze impeller mounted directly on the shaft of a ball bearing, splash-proof motor. As no alignment problem is encountered with this design, no flexible coupling is necessary.

A minimum of space is required for installation and the unit may be placed in any position and at any angle to fit the application. The units are available in capacities from 10 to 250 gallons per minute and for heads up to 190 feet with motors rated from ¾ to 10 horsepower to meet the requirements of a wide range of applications.

• • •

Welding Chart — Thomson-Gibb Electric Welding Co., Lynn, Mass., has issued a quick reference circular disk chart that indicates the correct type of equipment and the proper control settings to use for spot or flash welding any gage metal at any required production rate. The "Weld-O-Meter," as it is known is designed so that a single turn of the disk give all the information at a glance. On one side, the chart gives the type welder required, the transformer capacity, the heat regulator setting and the pressure needed to spot weld metals ranging from two thicknesses of 26-gage up to two thicknesses of ¼-inch stock at production speeds of from 30 to 120 spots per minute of the lighter gages to 5 to 20 on the heavier stocks. The spot welding chart also gives the current consumed per 1000 welds in kilowatt hours and suggests an alternative welder for the same work.



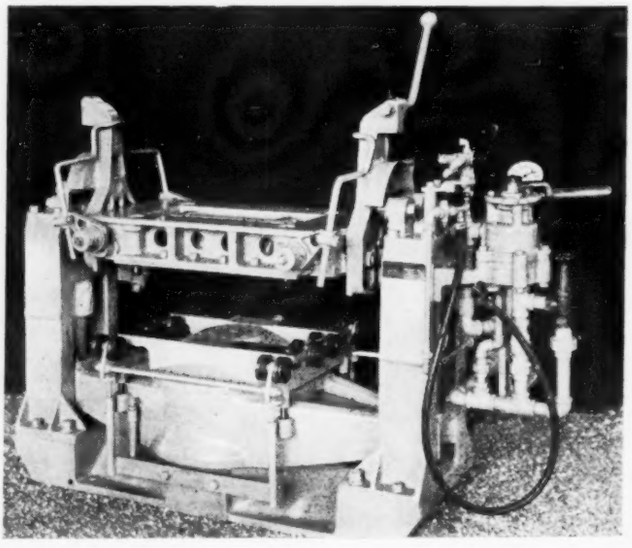
Thomson-Gibb "Weld-O-Meter" gives useful resistance welding facts

Reverse side of the chart contains similar information about the equipment needed to butt or flash weld metals ranging from 0.01 to 2 square inches in cross-section area. Complete information on the type welder, the proper clamping and push-up devices, the transformer capacity, heat setting and push-up pressure as well as the current consumed and the production per hour is shown when the dial is set at the point on the chart which represents the area of the metal to be welded. The chart is being distributed without charge to those who request it.

• • •

Molding Machine—Tabor Mfg. Co., 6225 Tacony street, Philadelphia, has introduced a new semi-shockless, jar, hand trunnion rollover, gravity pattern drawing molding machine. This unit, which is shown in the accompanying illustration, is designed for production work. The machine is built entirely above the floor line and therefore does not require a pit. It is built in three sizes having 13, 15, and 18-inch squeeze cylinders, with ample jarring capacity to take care of any load suitable to the respective sizes.

TABOR molding machine is built in three sizes having 13, 15 and 18-inch squeeze cylinders. The unit comes equipped with vibrator and rollers for rolling the completed mold from the unit conveniently



ENDLESS FOOT POUNDS

of ENERGY

Endurance, an outstanding quality of Rex Chain Drives, means the ability to transmit the full power load over long periods of time.

Drive Economy is the final answer, for coupled with this long life, is the low cost of maintenance of Rex Chain Drives.

Added to this is the positive efficiency of Chain Drives, 98½% for Rex Roller Chain—an important factor in power costs.

There are new ways of applying Power

Rex Chain Drives today offer many new opportunities for economies and for improvements in many types of drives—in your plant or on machinery you build.

Application Engineers of the Chain Belt Company are always available to help work out your drive problems, with a complete line of standard and special Rex Roller Chains, ⅜ to 2½ inch pitch and 270 standard Rex Chabelco Steel Chains or any Special Chain your service may require.

CHAIN BELT COMPANY
1660 W. Bruce St., Milwaukee, Wis.

CHAIN BELT
REX CHAIN COMPANY
CHAIN AND BELT CONVEYING

New Trade Publications

STAINLESS STEEL—American Rolling Mill Co., Middletown, O., has published a bulletin listing five advantages claimed for Armco stainless steel.

V-BELT DRIVE—Worthington Pump & Machinery Co., Harrison, N. J., in a current bulletin explains and illustrates its multi-V drive for solving many drive problems.

MOTORS—Ohio Electric Mfg. Co., 5900 Maurice avenue, Cleveland, in bulletin No. 214-A describes its motors for air conditioned heating systems, with a table of ratings.

WATER GAGE—Yarnall-Waring Co., Chestnut Hill, Philadelphia, has issued bulletin No. WG-1804, covering its eyeline indicator, which shows the water level in a boiler at floor level.

VENTILATION — Peerless Electric Co., Warren, O., in bulletin No. 204 covers its line of standard ventilating equipment. A feature is its speed controller now used on its blower and exhaust fans.

ARC WELDER—Bulletin No. 308 by the Lincoln Electric Co., Cleveland, covers its alternating current motor-driven types SAC 300 and SAC 500 shielded arc welders, with illustrations and specifications.

AIR COMPRESSOR — Pennsylania Pump & Compressor Co., Easton, Pa., in bulletin No. 157 describes its class 3AT air cushion valve compressor, with illustrations of details, table of sizes and capacities and full description.

PYROMETER—Pyrometer Instrument Co., 103 Lafayette street, New York, has issued a catalog of its immersion pyrometer for foundry use. Indicator hand remains fixed to allow reading after removal from ladle.

AFTERCOOLERS—A bulletin by the Ingersoll-Rand Co., Phillipsburg, N. J., illustrates various types of aftercoolers, with reasons for their need and how the types fit certain compressor plant conditions. It is bulletin No. 9212.

BOILER FEED CONTROL—Northern Equipment Co., Erie, Pa., has published an illustrated paper by E. G. Grady, plant engineer, on operating experience with high pressure boiler feed control. It is folder No. 137.

COMPRESSORS—Chicago Pneumatic Tool Co., 6 East Forty-fourth street, New York, in bulletin No. 728 gives complete details of a newly-designed line of compressors, known as type T. It is completely illustrated to show details.

LUBRICATION—The Texas Co., 135 East Forty-second street, New York, in its December issue of *Lubrication* covers use of lubricants in variable speed transmissions and also thin oil film lubrication.

MAGNETIC CLUTCHES — Magnetic Mfg. Co., Milwaukee, has issued its bulletin No. 200, describing part of its line of multiple disk magnetic clutches, with specifications for all sizes over six inches.

BENCH SANDER—Porter-Cable Machine Co., Syracuse, N. Y., in a current leaflet describes its new type B-12 bench-type belt sander and grinder. Specifications and description, with a list of suggested uses cover the subject.

TRACTOR ATTACHMENTS—A booklet by Caterpillar Tractor Co., Peoria, Ill., describes and illustrates its special attachments for special needs, refinements to meet conditions in the field. Illustrations show their application in striking fashion.

SPRAY EQUIPMENT — Descriptions, prices and illustrations of spray guns for finishing, cleaning and oiling cup-type containers, pressure containers and other products are included in bulletin AD-114 by the Binks Mfg. Co., 3114 Carroll avenue, Chicago.

GEAR LAPPING—Hutto Engineering Co., 515 Lycaste avenue, Detroit, in a current bulletin covers its new development in accurate production gear lapping for spur, helical and herringbone gears. Text and illustrations explain the novel method employed.

NAILS—Angell Nail & Chaplet Co., 4580 East Seventy-first street, Cleveland, has issued a leaflet on the importance of nails being made to a design to strengthen points of greatest stress The nail is analyzed from the standpoint of construction, use and serviceability.

DIAMOND DRESSER—Koebel Diamond Tool Co., 1200 Oakmont boulevard, Detroit, has issued three bulletins on its diamond dressing tools for truing grinding wheels. They cover its multiset, multi-edge and multi-point dressers, with illustrations, diagrams and tables of recommendations.

ARC WELDERS—General Electric Co., Schenectady, N. Y., has issued a booklet on its type WD electric arc welders with illustrations of details of construction and full description of operation. Bulletin No. GEA 1546B, superseding 1546A, is devoted to the company's welding electrodes and accessories.

STRUCTURAL STEEL—Bethlehem Steel Co., Bethlehem, Pa., has issued booklet No. 78 on its light steel sections, for economy in construction. It points out the greater latitude for more economical design. Illustrations show structures in which they have been used to advantage. A chart of properties and weights is included.

TOOL HOLDERS—Armstrong Bros. Tool Co., Chicago, has issued catalog No. B-34 on its tool holders, tools and other machine tool accessories. The booklet is fully indexed for ease in finding classifications and single items. It presents 35 new lines or additions and a new line of turret lathe and screw machine tools.

LUBRICATION — A pamphlet prepared jointly by the Meriam Co., 1955 West 112th street, Cleveland, and engineers of the Socony-Vacuum Oil Co. contains operating instructions and oil and lubricating data for users of Meriam-rebuilt gas engines. The practical facts and diagrams are designed to assist gas engine users generally.

WELDED AND RIVETED PRODUCTS — Downingtown Iron Works, Downingtown, Pa., has issued a booklet on its installations of carbon steel and alloy plate installations, to illustrate the wide variety of work produced by this company. It is made up largely of illustrations, with a table of capacity of cylindrical vessels per foot of length.

ACCUMULATORS — Seamless Steel Equipment Corp., 39 Broadway, New York, has issued a bulletin on its compressed air accumulators without pistons or floats, and its hydraulic presses. It has taken over representation of the Hydraulic G.m.b.H. of Duisburg, Germany, builder of presses for many purposes.

VALVES — Merco Nordstrom Valve Co., subsidiary of Pittsburgh Equitable Meter Co., has issued a service chart of proper care of its lubricated plug valves under headings of operation, adjustment, lubrication and repair. It is printed on heavy stock for tacking on the wall of the operating headquarters for ready reference.

RUBBER PRODUCTS—A book of engineering data designed to simplify selection of belting, hose and other mechanical rubber goods for industrial service has been issued by the B. F. Goodrich Co., mechanical division, Akron, O. More than 200 items are described and more than 100 diagrams and photographs illustrate the text.

REFRACTORIES—A folder by the Harbison-Walker Refractories Co., 1800 Farmers Bank building, Pittsburgh, entitled "Insulate With Safety at Any Temperature", deals with selection of the proper refractory and insulating material for any insulated furnace and describes insulating brick and light weight brick and their applications.

GRINDING WHEELS—Norton Co., Worcester, Mass., is distributing a booklet of information on grinding wheels and their selection. It is filled with valuable data on selection and use of this precision tool, including wheel specifications, meaning of wheel markings, selection of specifications, variable factors, with tables of recommendations and speeds.

MOTOR BRUSHES—Ohio Carbon Co., 12508 Berea road, Lakewood, O., has prepared a booklet on the brush phase of motor maintenance for those charged with operation and maintenance of plant electrical equipment. Various forms of trouble are described and their solution indicated and instruction is given for proper maintenance of brushes, commutators and slip rings.

THERMOSTATIC BIMETAL—General Plate Co., Attleboro, Mass., in its bulletin No. 301 describes and shows applications of its laminated material containing one layer of high thermal expansion and the other low. These strips are of cheaper metals, replacing the precious metals formerly used at high cost. Illustrations suggest uses for this metal in temperature control.

Pig Iron Makes Record Gains; Steel Rate 54½

Increase in Iron Output Largest of Any January — Autobody Sheet Mills Above 80 Per Cent, With Deliveries a Problem — Broad Manufacturing Demand

A 43.6 per cent increase in pig iron production in January, with a net gain of 22 active blast furnaces, and a further rise of 1½ points in steelworks operations last week to 54½ per cent, manifest the strong and unusually diverse character of manufacturing demand for iron and steel.

Pig iron production last month averaged 47,627 gross tons daily, up 14,466 tons; and total output was 1,476,424 tons, an increase of 448,418 tons. Both these gains were the largest for any January in history. The increase in the number of blast furnace stacks to 89, operating Jan. 31, was the largest for the month except January, 1920, when the net gain was 23, and January 1925, with a net of 22. The month's output was the highest since June, 1934.

This gain in pig iron is expected to be matched with a long stride in steel ingot production for January when official figures are announced this week, the steel rate as an average having been 13 points higher than in December. The month's steel bookings for leading interests were twice those of December, and thrice January last year. Steelmakers now confidently expect the current operating rate to continue or improve through February and March.

Sheet Mills Hard Pressed for Delivery; Tin Plate Operations at 85 Per Cent

Deliveries to automobile manufacturers are becoming a problem, and it is more apparent they are striving to build up inventories of materials and parts. Autobody sheet production is now 80 per cent. The majority of mills are booked to capacity for cold-rolled sheets for this quarter, and consumers are seeking preferred position for second quarter. Tinplate mills are operating at 85 per cent.

The automobile industry has made a good start on its schedule for 1,000,000 cars this quarter, last week's output of 73,000 raising the total for January slightly above 300,000. Washington is renewing efforts to level out peaks and valleys, but if introduction of new models be moved up several months, as proposed, midsummer unemployment in the steel industry may be intensified.

Steelmakers must decide by Feb. 20 on prices for second quarter, and so far as pertains to automobile manufacturers—always antagonistic to advances—this is a sellers' market. Opinion in the industry, however, is divided, with some leading producers leaning to a continuation of present levels. Reports that premiums have been offered for prompt shipment pertain to drawing extras, sometimes waived, which mills now find easier to obtain.

Structural work and railroads are contributing little to steelworks activity. Both evidently are awaiting lifts from the government—structurals, in the $4,000,000,000 public works program; railroads in proposed freight advances and low interest rates on federal loans.

Structural Awards Falling Behind 1934; Year's Iron, Steel Exports Up 117 Per Cent

Structural shape awards in the first five weeks this year are only 75 per cent of the tonnage in the comparable period last year. Last week they amounted to only 10,052 tons. Amtorg Trading Corp. has ordered for Russia 4500 tons of forged steel wheels and axles from the Carnegie Steel Co. Southern Pacific has placed 12,559 tons of rails; Wheeling & Lake Erie, 2200 tons. Atlantic Coast Line is inquiring for 5000 tons.

Scrap consumption is rising, but many consumers are over-supplied and STEEL's scrap price index last week dropped 43 cents to $11.65. A valley steelworks purchased 50,000 tons, and 70,000 tons were taken for shipment to Italy.

A decline in scrap shipments was principally responsible for a reduction of 5.5 per cent in December iron and steel exports to 282,655 tons. Imports fell off 44 per cent to 19,708 tons. For the year 1934 iron and steel exports of 2,832,764 tons were up 117 per cent; imports, 316,761 tons, down 23.6 per cent.

Steelworks operations in the Pittsburgh district last week rose 6 points to 44 per cent; Chicago 7 to 66; eastern Pennsylvania 1½ to 30; Buffalo 1 to 45; Birmingham ½-point to 32. Detroit held at 100; Wheeling 95; Youngstown 64; while Cleveland was off 1 to 78 and New England 16 to 52.

The scrap reduction has lowered STEEL's iron and steel price composite 4 cents to $32.56, while the finished steel index is unchanged at $54.

COMPOSITE MARKET AVERAGES

	Feb. 2	Jan. 26	Jan. 19	One Month Ago Jan., 1934	Three Months Ago Nov., 1934	One Year Ago Feb., 1934	Five Years Ago Feb., 1930
Iron and Steel	$32.56	$32.60	$32.62	$32.58	$32.15	$31.30	$3492
Finished Steel	54.00	54.00	54.00	54.00	54.00	51.10	55.03
Steelworks Scrap	11.65	12.08	12.25	12.03	9.82	11.72	14.42

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Feb. 2, 1935	Jan., 1935	Nov., 1934	Feb., 1934
Steel bars, Pittsburgh	1.80c	1.80c	1.80c	1.75c
Steel bars, Chicago	1.85	1.85	1.85	1.80
Steel bars, Philadelphia	2.09	2.09	2.09	2.04
Iron bars, Terre Haute, Ind.	1.75	1.75	1.75	1.60
Shapes, Pittsburgh	1.80	1.80	1.80	1.70
Shapes, Philadelphia	2.00½	2.00½	2.00½	1.90½
Shapes, Chicago	1.85	1.85	1.85	1.75
Tank plates, Pittsburgh	1.80	1.80	1.80	1.70
Tank plates, Philadelphia	1.98½	1.98½	1.98½	1.88½
Tank plates, Chicago	1.85	1.85	1.85	1.75
Sheets, No. 10, hot rolled, Pitts.	1.85	1.85	1.85	1.75
Sheets, No. 24, hot ann., Pitts.	2.40	2.40	2.40	2.25
Sheets, No. 24, galvan., Pitts.	3.10	3.10	3.10	2.85
Sheets, No. 10 hot rolled, Gary	1.95	1.95	1.95	1.85
Sheets, No. 24, hot anneal., Gary	2.55	2.55	2.55	2.35
Sheets, No. 24, galvan., Gary	3.20	3.20	3.20	2.95
Plain wire, Pittsburgh	2.30	2.30	2.30	2.20
Tin plate, per base box, Pitts.	5.25	5.25	5.25	5.25
Wire nails, Pittsburgh	2.60	2.60	2.60	2.35

Semifinished Material

Sheet bars, open-hearth, Youngs.	$28.00	$28.00	$28.00	$26.00
Sheet bars, open-hearth, Pitts.	28.00	28.00	28.00	26.00
Billets, open-hearth, Pittsburgh	27.00	27.00	27.00	26.00
Wire rods, Pittsburgh	38.00	38.00	38.00	36.00

Pig Iron

Bessemer, del. Pittsburgh	$19.76	$19.76	$19.76	$19.26
Basic, Valley	18.00	18.00	18.00	17.00
Basic, eastern, del. eastern Pa.	19.76	19.76	19.76	18.76
No. 2 foundry, del. Pittsburgh	19.26	19.26	19.26	18.76
No. 2, foundry, Chicago	18.50	18.50	18.50	17.50
Southern No. 2, Birmingham	14.50	14.50	14.50	13.50
No. 2X eastern, del. Philadelphia	20.63	20.63	20.63	19.63
Malleable, Valley	18.50	18.50	18.50	17.50
Malleable, Chicago	18.50	18.50	18.50	17.50
Lake Superior charcoal, del. Chi.	24.04	24.04	24.04	23.54
Ferromanganese, del. Pittsburgh	89.79	18.63	18.63	18.38
Gray forge, del. Pittsburgh	18.63	89.79	89.79	90.24

Scrap

Heavy melting steel, Pittsburgh	$13.25	$13.50	$11.15	$13.90
Heavy melt. steel, No. 2, east, Pa.	10.25	9.95	8.35	9.75
Heavy melting steel, Chicago	11.75	12.15	9.10	10.90
Rails for rolling, Chicago	12.75	12.90	10.35	11.90
Railroad steel specialties, Chicago	12.75	13.40	10.05	12.50

Coke

Connellsville, furnace, ovens	$3.60	$3.60	$3.60	$3.50
Connellsville, foundry, ovens	4.60	4.60	4.60	4.25
Chicago, by-product foundry, del.	9.25	9.25	9.25	9.25

Steel, Iron, Raw Material, Fuel and Metals Prices

Prices are code levels filed with American Iron and Steel Institute, 350 Fifth avenue, New York. Except when otherwise designated, prices are base, f.o.b. cars. Asterisk denotes price change this week.

Sheet Steel

Hot Rolled No. 10, 24-48 in.

Pittsburgh	1.85c
Gary	1.95c
Chicago, delivered	1.98c
New York, del.	2.18c
Philadelphia, del	2.14c
Birmingham	2.00c
St. Louis, del.	2.17c
Pacific ports, f.o.b. cars, dock	2.40c

Hot Rolled Annealed No. 24

Pittsburgh	2.40c
Gary	2.50c
Chicago, delivered	2.53c
Detroit, delivered	2.60c
New York, del.	2.73c
Philadelphia, del.	2.69c
Birmingham	2.55c
St. Louis, del.	2.72c
Pacific ports, f.o.b. cars, dock	3.05c

Galvanized No. 24

Pittsburgh	3.10c
Gary	3.20c
Chicago, delivered	3.23c
Philadelphia, del.	3.39c
New York, del.	3.43c
Birmingham	3.25c
St. Louis, del.	3.42c
Pacific ports, f.o.b. cars, dock	3.70c

Tin Mill Black No. 28

Pittsburgh	2.75c
Gary	2.85c
St. Louis, delivered	3.07c

Cold Rolled No. 10

Pittsburgh	2.50c
Gary	2.60c
Detroit, delivered	2.70c
Philadelphia, del.	2.79c
New York, del.	2.83c
Pacific ports, f.o.b. cars, dock	3.10c

Cold Rolled No. 20

Pittsburgh	2.95c
Gary	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.24c
New York, del.	3.28c

Enameling Sheets

Pittsburgh, No. 10	2.50c
Pittsburgh, No. 20	3.10c

Tin and Terne Plate

Gary base, 10 cents higher.

Tin plate, coke base con. (box) Pitts.	$5.25
Do., waste-waste	2.75c
Do., strips	2.50c
Long ternes, No. 24 unassorted, Pitts.	3.40c
Do., Gary	3.50c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	23.00	24.00
Plates	26.00	28.00
Sheets	33.00	35.00
Hot strip	20.75	22.75
Cold strip	27.00	29.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	17.00	18.50	21.00	26.00
Plates	20.00	21.50	24.00	29.00
Sheets	25.00	28.00	31.00	35.00
Hot strip	15.75	16.75	21.75	26.75
Cold stp.	20.50	22.00	27.00	35.00

Steel Plates

Pittsburgh	1.80c
New York, del.	2.08c
Philadelphia, del.	1.98½c
Boston, delivered	2.20c
Buffalo, delivered	2.03½c
Chicago or Gary	1.85c
Cleveland, del.	1.98½c
Birmingham	1.95c
Coatesville, base	1.90c
Sparrows Pt., base	1.90c
Pacific ports, f.o.b. cars, dock	2.35c
St. Louis, delivered	2.07c

Structural Shapes

Pittsburgh	1.80c
Philadelphia, del.	2.00½c
New York, del.	2.05½c
Boston, delivered	2.18½c
Bethlehem	1.90c
Chicago	1.85c
Cleveland, del.	1.98½c
Buffalo	1.90c
Gulf Ports	2.20c
Birmingham	1.95c
Pacific ports, f.o.b. cars, dock	2.35c

Bars

Soft Steel

Pittsburgh	1.80c
Chicago or Gary	1.85c
Duluth	1.95c
Birmingham	1.95c
Cleveland	1.85c
Buffalo	1.90c
Detroit, delivered	1.95c
Pacific Coast ports cars, dock, c.i.f.	2.35c
Philadelphia, del.	2 09c
Boston, delivered	2.20c
New York, del.	2.13c
Pitts., forg. qual.	1.95c-2.05c

Rail Steel

To Manufacturing Trade

Pittsburgh	1.70c
Chicago or Gary	1.75c
Moline, Ill.	1.75c
Cleveland	1.75c
Buffalo	1.80c

IRON

Terre Haute, Ind.	1.75c
Chicago	1.80c
Philadelphia	1.89c
Pittsburgh, refined	2.75-7.50c

REINFORCING

New billet, straight lengths, quoted by distributors.

Pittsburgh	2.05c
Chicago, Gary, Buffalo Cleve., Birm., Young	2.10c
Gulf ports	2.45c
Pacific coast ports f.o.b. cars dock	2.45c
Philadelphia, del.	2.34c

Rail Steel

Straight lengths quoted by distributors

Pittsburgh	1.90c
Chicago, Buffalo, Cleveland, Birm., Young	1.95c
Gulf ports	2.30c

Wire Products

(Prices apply to straight or mixed carloads; pool cars, or less, 15c up. 10% dis. on nail extras on straight or mixed carloads to one consignee.)

Base, Pitts.-Cleve. 100 lb. keg

Standard wire nails	$2.60
Cement coated nails	2.60
Galvanized nails, 15 gage and coarser	4.60c
do., 16 gage and finer	5.10c

(Per pound)

Polished staples	3.30c
Galvanized fence staples	3.55c
Barbed wire, galv.	3.00c
Annealed fence wire	2.45c
Galvanized fence wire	2.80c
Woven wire fencing (base column, c.l.)	$63.00
Plain wire, 6-9 gage to mfg. trade	2.30c

Anderson, Ind., (merchant products only) and Chicago up $1; Duluth up $2; Birmingham up $3.

Spring wire, Pittsburgh or Cleveland	2.90c

Do., Chicago up $1, Worcester, $2.

Cold-Finished Carbon Bars and Shafting

Base Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs.	2.10c
20,000 to 59,999 lbs.	2.05c
60,000 to 99,999 lbs.	2.00c
100,000 lbs and over	1.97½c

Gary, Ind., Cleveland, up 5c; Buffalo, up 10c; Detroit, up 20c; eastern Michigan, up 25c.

Alloy Steel Bars (Hot)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	2.45c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo. 0.50

4600 0.20 to 0.30 Mo. 1.25 1.75 Ni. 1.05

5100 0.80-1.10 Cr 0.45

5100 Cr. spring base

6100 bars 1.20

6100 spring 0.70

Cr., Ni., Van. 1.50

Carbon Van. 0.95

9250....Carbon base plus extras

Piling

Pittsburgh	2.15c
Chicago, Buffalo	2.25c

Strip and Hoops

Hot strip to 23¾-in. Pittsburgh	1.85c
Chicago, base	1.95c
Birmingham base,	2.00c
Detroit, delivered	2.05c
Phila., delivered	2.14c
New York, del.	2.18c
Cooperage hoop, Pittsburgh	1.95c
Chicago	2.05c
Cold-rolled strip, Pitts., Cleve.	2.60c
Worcester, Mass.	2.80c

Rails, Track Material

(Gross Tons)

Standard rails, mill	$36.37½
Relay rails, Pitts. 24-45 lbs.	$26.00
50-60 lbs.	$23.00
70-75 lbs.	$20.00
80-85 lbs.	$24.00
100 lbs.	$25.00
Light Rails billet qual, Pitts., Chi.	$35.00
Do., reroll. qual.	$34.00
Angle bars, mills	2.55c
Spikes, R. R. base	2.40c
Track bolts, base	3.55c
Tie plates, base	1.90c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $5; 16 and 20 lbs., up $1; 12 lbs. up $8; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade for all case lots. Dec. 1, 1932, lists.

CARRIAGE BOLTS

All sizes, cut thread	70-10-10 off
Rolled thread, ½ x 6 and smaller	70-10-10 off

MACHINE BOLTS

All sizes, cut thread lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts,	70-10-10 off
Tire bolts	60-10 off
Stove bolts, 75 off in pkgs.; 83 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch	
Rolled thread machine bolts, ½ x 6 and smaller	70-10-10 off
Step bolts	70-10 off
Elevator bolts	70-10 off

NUTS

S.A.E. semifinished hex.; ½ to ⅞-inch	70-10-10 off
Do., ½ to 1-inch	70-10-10 off
Do., over 1-inch	70-10-10 off

HEXAGON CAP SCREWS

Milled	85 off
Upset, 1-in., smaller	85 off

SQUARE HEAD SET SCREWS

Upset, 1-in. small	70-10 off
Headless set screws	75 off

Rivets, Wrought Washers

Struc., c. l., Pittsburgh, Cleveland	2.90c
Struc., c. l., Chicago	3.00c
⅞-in. and smaller, Pitts., Chi., Cleve.	70 and 5 off
Wrought washers, Pitts., Chi., Phila.	6.25 off

Cut Nails

Cut nails, Pitts.; (10% discount on size extras)	$2.75
Do. less carloads, 5 kegs or more no discount on size extras	$3.05
Do. under 5 kegs; no discount on size extras	$3.20

Pipe and Tubing

Base $200 net ton, except on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads, Gary, Ind., 2 points less. Chicago delivered 2½ points less. Wrought pipe, Pittsburgh base.

BUTT WELD

In.	Blk.	Gal.
Steel		
¼ and ⅜	53½	35
½	58½	47
¾	62	52
1—3	64	55
Iron		
½	31½	15
¾	36½	20½
1—1¼	39½	25½
2	41½	26

LAP WELD

Steel		
2	60	51
2½—3	63	54
3½—6	65	56
7 and 8	64	54
9 and 10	63½	53½
Iron		
2	37	22½
2½—3½	38	25
4—8	40	28½

LINE PIPE

Steel	
⅛, butt weld	57½
⅛-inch, butt weld	50½
¼—⅜, butt weld	52½
¾, butt weld	61
1—3, butt weld	63
2-inch, lap weld	59
2½—3, lap weld	62
3½—6, lap weld	64
7—8, lap weld	63
Iron	

⅛—1½ inch, black and galv. take 4 pts, over; 2½—6 inch 2 pts. over discounts for same sizes, standard pipe lists, 8—12-inch, no extra.

BOILER TUBES

C. L. Discounts, f.o.b. Pitts.

Lap Weld Steel		*Charcoal Iron*	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3½	50	3	17
4	52	3¼—3½	18
4½—5	42	4	20
		4½	21

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7½% discount on steel and 10% on charcoal iron.

Lapwelded steel: 200 to 9999 pounds, ten points under base, one 5% and one 7½%. Under 2000 pounds 15 points under base, one 5% and one 7½%. Charcoal iron: 10,000 pounds to carloads, base less 5%; under 10,000 lbs., 2 points under base.

SEAMLESS BOILER TUBES

Under date of May 15 in lots of 40,000 pounds or more for cold-drawn boiler tubes and in lots of 40,000 pounds or feet or more for hot-finished boiler tubes, revised prices are quoted for 55 cold-drawn boiler tube sizes ranging from ¼ to 6-inch outside diameter in 30 wall thicknesses, decimal equivalent from 0.035 to 1.000, on a dollars and cents basis per 100 feet and per pound.

Hot-finished carbon steel boiler tube prices also under date of May 15 range from 1 through 7 inches outside diameter, inclusive, and embrace 47 size classifications in 22 decimal wall thicknesses ranging from 0.109 to 1.000, prices also being on a lb. and 100 ft. basis.

Seamless Tubing

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,000 ft. or 22,500 lbs.	70%

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$38.00-39.00
4-in., Birmingham	41.00-42.00
4-in., Chicago	49.00-50.00
6 to 24-in., Chicago	46.00-47.00
6-in. & over, east fdy.	42.00
Do., 4-in.	45.00

Class A pipe $3 over Class B. Stnd. fitgs., Birm. base...$100.00

Semifinished Steel

BILLETS AND BLOOMS

4 x 4-inch base; gross ton

Pitts., Chi., Cleve., and Youngstown	$27.00
Philadelphia	32.30
Duluth	31.00
Forging, Pitts., Chi. and Buffalo	32.00
Forging, Duluth	36.00

SHEET BARS

Pitts., Cleve., Young., Chi., Buff., Canton, Sparrows Pt.	28.00

SLABS

Pitts., Cleve., Young.	27.00

WIRE RODS

(Common; combination up $2)

Pitts., Cleveland	38.00
Chicago	39.00
Worcester, Mass.	40.00

SKELP

Pitts., Chi., Young., Buff., Coatesville, Sparrows Point	1.70c

Coke

Price Per Net Ton

BEEHIVE OVENS

Connellsville, fur.	$3.60- 3.85
Connellsville, fdry.	4.60
Connel. prem. fdry.	5.10
New River fdry.	6.00
Wise county fdry	4.45- 5.25
Wise county fur.	4.00- 4.50

BY-PRODUCT FOUNDRY

Newark, N. J., del.	9.20- 9.65
Chi., ov., outside del.	8.50
Chicago, del.	9.25
New England, del.	11.00
St. Louis, del.	9.25
Birmingham, ovens	6.00
Indianapolis, del.	8.75
Cincinnati, del.	9.30
Cleveland, del.	9.25
Buffalo, ovens	7.50- 8.00
Detroit ov., out. del.	8.50
Philadelphia, del.	9.00

Coke By-Products

Per gallon, producers' plants.

	Tank lots	Spot
Pure and 90% benzol	15.00c	
Toluol	30.00c	
Solvent naphtha	26.00c	
Commercial xylol	26.00c	

Per lb. f.o.b. New York.

Phenol (200 lb. drums)	16.30c
Do. (100 lbs.)	17.30c

Eastern Plants, per lb.

Naphthalene flakes and balls, in bbl.	5.25c

Per 100 lb. Atlantic seaboard

Sulphate of ammonia	$1.20

†Western prices, ½-cent up.

Pig Iron

Delivered prices do not include switching charges except as noted. No. 2 foundry iron is 1.75-2.25 silicon; 25-cent differentials apply for each 0.25 silicon above 2.25; 50-cent differentials apply to any grade below 1.75. Gross tons.

BASING POINTS:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$19.50	$20.00	$19.00	$20.50
Birdsboro, Pa.	19.50	20.00	19.00	20.50
Birmingham, Ala., southern del.	14.50	14.50	13.50	19.00
Buffalo	18.50	19.00	17.50	19.50
Chicago	18.50	18.50	18.00	19.00
Cleveland	18.50	18.50	18.00	19.00
Detroit	18.50	18.50	18.00	19.00
Duluth	19.00	19.00	.....	19.50
Erie, Pa.	18.50	19.00	18.00	19.50
Everett, Mass.	19.50	20.00	19.00	20.50
Granite City, Ill.	18.50	18.50	18.00	.....
Hamilton, O.	18.50	18.50	18.00	19.00
Jackson, O.	20.25	20.25	19.75	.....
Neville Island, Pa.	18.50	18.50	18.00	19.00
Provo, Utah	17.50	.....	17.00	.....
Sharpsville, Pa.	18.50	18.50	18.00	19.00
Sparrows Point, Md.	19.50	.....	19.00	.....
Swedeland, Pa.	19.50	20.00	19.00	20.50
Toledo, O.	18.50	18.50	18.00	19.00
Youngstown, O.	18.50	18.50	18.00	19.00
DELIVERED FROM BASING POINTS:				
Akron, O., from Cleveland	19.76	19.76	19.26	20.26
Baltimore from Birmingham	20.02	.....	19.90	.....
Boston from Birmingham	19.62	.....	19.50	.....
Boston from Everett, Mass.	20.00	20.50	19.50	21.00
Boston from Buffalo	20.00	20.50	19.50	21.00
Brooklyn, N. Y., from Bethlehem	21.77	22.27	.....	.....
Brooklyn, N. Y., from Bmgham.	21.39	.....	.....	.....
Canton, O., from Cleveland	19.76	19.76	19.26	20.26
Chicago from Birmingham	†18.72	.....	18.60	.....
Cincinnati from Hamilton, O.	19.51	19.51	19.01	.....
Cincinnati from Birmingham,	19.13	.....	19.01	.....
Cleveland from Birmingham	18.62	.....	18.50	.....
Indianapolis from Hamilton, O.	20.77	20.77	20.27	21.27
Mansfield, O., from Toledo, O.	20.26	20.26	19.76	20.76
Milwaukee from Chicago	19.50	19.50	19.00	20.00
Muskegon, Mich., from Chicago, Toledo or Detroit	21.40	21.40	20.90	21.90
Newark, N. J., from Birmingham	20.51	.....	.....	.....
Newark, N. J., from Bethlehem	20.89	21.39	.....	.....
Philadelphia from Birmingham	19.88	.....	19.76	.....
Philadelphia from Swedeland, Pa.	20.26	20.76	19.76	.....
Pittsburgh district from Neville Island	(Neville Island base, plus 63c, 76c and $1.13 switching chgs.)			
Saginaw, Mich., from Detroit	20.60	20.60	20.10	21.10
St. Louis from Granite City, Ill.	19.00	19.00	18.50	.....
St. Louis from Birmingham	18.62	.....	18.50	.....
St. Paul from Duluth	20.94	20.94	.....	21.44

†Over 0.70 phos.

LOW PHOS.

Basing Point: Philadelphia, standard and copper bearing 24.63
N. Y.—$23.50.
Basing Point: Philadelphia, standard and copper bearing 24.63

GRAY FORGE		CHARCOAL	
Valley furnace	18.00	Lake Superior fur.	21.00
Pitts. dist. fur.	18.00	Do., del. Chicago	24.04

SILVERY†

Jackson County, O., base; 6%—$22.75; 7—$23.75; 8—$24.75; 9—$25.70; 10—$26.75; 11—$27.75. Buffalo base prices, $1.25 higher.

BESSEMER FERROSILICON†

Jackson County, O., base, 10%—$27.75; 11—$28.75; 12—$30.25; 13—$31.75; 14—$33.25; 15—$34.75; 16—$36.25. Buffalo base prices $1.25 higher.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Iron Ore

LAKE SUPERIOR ORE
Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.80
Mesabi nonbess.	4.50
High phosphorus	4.40
Mesabi bessemer	4.65
Old range nonbes.	4.65

EASTERN LOCAL ORES
Cents, unit, del. E. Pa.

Foundry and basic 56-63% con. (nom.)	8.00- 9.00
Cop.-free low phos. 58-60% (nom.)	10.00-10.50

FOREIGN ORE
Cents per unit, f.a.s. Atlantic ports (nominal)

Foreign manganiferous ore, 45.55% iron, 6-10% man.,	10.00
No. Afr. & low phos.	9.50
Swedish basic, 65%	9.00
Swedish low phos.	9.50
Spanish No. Africa basic, 50 to 60%	9.00
Tungsten, spot, sh. ton unit, duty pd.	$17.75-18.25
N. F. fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$18.00-18.50

Manganese Ore

(Nominal)

Prices not including duty, cents per unit cargo lots.

Caucasian, 52-55%	26.00
So. African, 52%	26.00
So. Afr., 49-51%	24.00
Indian, 58-50%	nominal
Indian, 48-50%	nominal

Refractories

Per 1000 f.o.b. Works

FIRE CLAY BRICK
First Quality.

Pa., Ill., Ky., Md., Ga., Mo.	$45.00
Alabama	45.00
Second Quality	
Pa., Ill., Ky., Md., Mo., Ga., Ala.	40.00
Ohio	
First quality	$40.00-45.00
Intermediary	37.00
Second quality	28.00
MALLEABLE BUNG BRICK	
All bases	50.00
SILICA BRICK	
Pennsylvania	$45.00
Joliet, E. Chicago	54.00
Birmingham, Ala.	52.00
MAGNESITE	
Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Domestic dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	40.00
Domestic dead-burned gr. net ton f.o.b. Chewelah, Wash. (bulk)	22.00
BASIC BRICK	
Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.	
Magnesite brick	$65.00
Chrome brick	45.00
Chemically bonded magnesite	55.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$19.50
Washed gravel f.o.b. Ill., Ky., net ton, carloads	$15.50-16.00

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82% tidewater, duty paid	85.00
Do., Balti. base	85.00
Do., del. Pittsburgh	89.79
Spiegeleisen, 19-20% dom. Palmerton, Pa., spot†	26.00
Do., New Orleans	26.00
Ferrosilicon, 50% freight all., cl.	77.50
Do., less carload	85.00
Do., 75 per cent	126-130.00
Spot, $5 a ton higher.	
Silicomang., 2½ carb.	90.00
2% carbon, 95.00; 1%, 105.00	
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. con. del.	10.00
Ferrotungsten, stand., lb. cont. del.	1.35- 1.45
Ferrovanadium, 35 to 40% lb., cont., on analysis	2.70- 2.90
Ferrotitanium, c. l., prod. plant, frt. allow., net ton	137.50
Spot, 1 ton, frt. allow., lb.	7.00
do., under 1 ton	7.50
Ferrophosphorus, per ton, c. l., 17-19% Rockdale, Tenn., basis, 18%, $2 unitage	50.00
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $2.75 unitage	65.00
Ferromolybdenum, stand. 55-65%, lb.	0.95
Molybdate, lb. cont.	0.80

†Carloads, Quan. diff. apply.

Nonferrous Mill Products

F.o.b. mill base, cents per lb. except as specified. Copper, brass products based on 9.00c Conn. copper.

Sheets	
Yellow brass (high)	14.25
Copper, hot rolled	16.00
Lead, cut, to jobbers	7.25
Zinc, 100-lb. base	9.50
Tubes and Pipes	
High yellow brass	16.00
Seamless copper	16.25
Rods	
High yellow brass	12.75
Copper, hot rolled	13.25
Anodes	
Copper, untrimmed	13.75
Wire	
Yellow brass (high)	14.75

Old Metals

Deal. buying prices, cents lb.

No. 1 Composition Red Brass	
*New York	4.25- 4.50
Chicago	4.37½-4.62½
*Cleveland	5.12½ -5.35
St. Louis	4.75- 5.00
Heavy Copper and Wire	
*New York	5.62½-5.87½
Chicago, No. 1	5.50- 5.75
*Cleveland	5.50- 5.75
St. Louis	5.50- 5.65
Composition Brass Borings	
*New York	3.75- 4.00
Light Copper	
*New York	4.37½-4.62½
Chicago	4.25- 4.50
*Cleveland	4.75- 5.00
St. Louis	4.75- 5.00
Light Brass	
Chicago	2.25- 2.50
Cleveland	2.50- 2.75
Lead	
New York	2.75- 2.85
Cleveland	2.75- 3.00
Chicago	2.75- 3.00
St. Louis	2.75- 2.90
Zinc	
New York	1.75- 2.00
Cleveland	1.75- 2.00
St. Louis	2.25- 2.40
Aluminum	
Borings, Cleveland	7.50- 8.00
Mixed, cast, Clev.	12.50-13.00
Mixed, cast, St. L.	13.00-13.50
Clips, soft, Clev.	13.50-14.00

Secondary Metals

Brass ingot, 85-5-5-5	8.25
Stand. No. 12 Alum.	16.00-17.00

Iron and Steel Scrap Prices

Corrected to Friday night Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	9.00- 9.50
Boston, dock, expt.	9.00- 9.25
Boston, domestic	7.25- 7.50
Buffalo, No. 1	12.00-12.50
Buffalo, No. 2	10.50-11.00
Chicago, No. 1	11.50-11.75
Cleveland, No. 1	11.00-11 50
Cleveland, No. 2	10.50-11.00
Detroit, No. 1	9.50-10.00
Detroit, No. 2	8.50- 9.00
Eastern Pa., No. 1	11.50-12.00
Eastern Pa., No. 2	10.00-10.50
Federal, Ill.	8.50- 9.00
Granite City, R. R.	9.50-10.00
Granite City, No. 2	7.50- 8.00
N. Y., deal. No. 2	7.50- 7.75
N. Y., deal. barge	9.00- 9.25
Pittsburgh, No. 1	13.00-13.50
St. Louis	8.00- 8.50
Valleys, No. 1	13.75-14.00

COMPRESSED SHEETS ☐

Buffalo, dealers	10.50-11.00
Chicago, factory	11.00-11.50
Chicago, dealer	9.50-10.00
Cleveland	11.00-11.50
Detroit	10.00-10.50
E. Pa., new mat.	10 00-10.50
Pittsburgh	13.00-13.50
St. Louis	7.00- 7.50
Valleys	13.25-13.50

BUNDLED SHEETS ☐ ☐

Buffalo	8.00- 8.50
Cincinnati, del.	7.00- 7.50
Cleveland	8.50- 9.00
Pittsburgh	11.50-12.00
St. Louis	5.00- 5.50

SHEET CLIPPINGS, LOOSE ☐

Chicago	6.00- 6.50
Cincinnati	6.50- 7.00
Detroit	5.00- 5.50
St. Louis	5.00- 5.50

STEEL RAILS, SHORT ☐

Birmingham	12.00-12.50
Buffalo	13.00-13.50
Chicago (3 ft.)	13.00-13.50
Chicago (2 ft.)	14.00-14.50
Cincinnati, del.	12.50-13.00
Detroit	12.00-12.50
Pitts., open-hearth, 3 ft. and less	15.00-15.50
St. Louis, 2 ft. & less	12.50-13.00

STEEL RAILS, SCRAP ☐

Boston	7.00- 7.25
Chicago	11.50-11.75
Pittsburgh	14.50-15.00

STOVE PLATE ☐ ☐

Birmingham	6.00- 6.50
Boston, dealers	3.25- 3.75
Buffalo	9.25- 9.75
Chicago, net	6.50- 7.00
Cincinnati, dealers	6.50- 7.00
Detroit, net	6.00- 6.50
Eastern Pa.	8.50- 9.00
N. Y., deal. fdry.	6.00
St. Louis	5.50- 6.00

COUPLERS, SPRINGS

Buffalo	13.25-13.75
Chicago, springs	13.00-13.50
Eastern Pa.	14.50-15.00
Pittsburgh	15.00-15.50
St. Louis	10.50-11.00

ANGLE BARS—STEEL ☐

Chicago	13.00-13.50
St. Louis	11.00-11.50

RAILROAD SPECIALTIES

Chicago	12.50-13.00

LOW PHOSPHORUS

Buffalo, billets and bloom crops	13.25-13.75
Cleveland, billet, bloom crops	15.00-15.50
Eastern Pa., crops	15.00-15.50
Pittsburgh, billet, bloom crops	15.00-15.50
Pittsburgh, sheet bar crops	14.00-14.50

FROGS, SWITCHES ☐ ☐

Chicago	11.50-12.00
St. Louis, cut	10.50-11.00

SHOVELING STEEL ☐ ☐

Chicago	11.50-11.75
Federal, Ill.	8.50- 9.00
Granite City, Ill.	7.50- 8.00

RAILROAD WROUGHT ☐

Birmingham	7.50- 8.00
Boston, dealers	6.00- 6.50
Buffalo, No. 1	10.00-10.50
Buffalo, No. 2	12.00-12.50
Chicago, No. 1, net	10.50-11.00
Chicago, No. 2	11.50-11.75
Cincinnati, No. 2	9.00- 9.50
Eastern Pa.	11.50-12.00
N. Y., No. 1, deal.	7.00- 7.50
St. Louis, No. 1	7.00- 7.50
St. Louis, No. 2	9.75-10.25

SPECIFICATION PIPE ☐

Boston	3.00- 3.25
Eastern Pa.	9.50-10.00
New York, dealers	3.50- 4.00

BUSHELING ☐ ☐

Buffalo, No. 1	10.50-11.00
Chicago, No. 1	10.25-10.75
Cinci., No. 1, deal.	7.00- 7.50
Cincinnati, No. 2	3.50- 4.00
Cleveland, No. 2	7.50- 8.00
Detroit, No. 1, new	8.50- 9.00
Valleys, new, No. 1	12.75-13.25

MACHINE TURNINGS ☐

Birmingham	4.50- 5.00
Boston, dealers	3.00- 3.25
Buffalo	6.00- 6.50
Chicago	6.50- 7.00
Cincinnati, dealers	4.50- 5.00
Cleveland	7.50- 8.00
Detroit	5.50- 6.00
Eastern Pa.	6.50- 7.00
New York, dealers	3.50- 3.75
Pittsburgh	9.25- 9.75
St. Louis	3.50- 4.00
Valleys	10.00-10.50

BORINGS AND TURNINGS ☐

For Blast Furnace Use

Boston, dealers	3.25- 3.50
Buffalo	6.50- 7.00
Cincinnati, dealers	4.50- 5.00
Cleveland	7.50- 8.00
Detroit	5.75- 6.25
Eastern Pa.	5.00
New York, dealers	1.50- 1.75
Pittsburgh	6.75- 7.25

CAST IRON BORINGS

Birmingham, plain	4.50- 5.00
Boston, chemical	8.50- 9.00
Boston, dealers	3.25- 3.50
Buffalo	6.50- 7.00
Chicago	6.50- 7.00
Cincinnati, dealers	4.00- 4.50
Cleveland	7.50- 8.00
Detroit	5.75- 6.25
E. Pa., chemical	12.00-13.00
New York, dealers	1.50- 1.75
Pittsburgh	6.75- 7.25
St. Louis	3.00- 3.50

PIPE AND FLUES ☐ ☐

Cincinnati, dealers	5.50- 6.00

RAILROAD GRATE BARS ☐

Buffalo	7.00- 7.50
Chicago, net	6.00- 6.50
Cincinnati	5.50- 6.00
Eastern Pa.	9.00
New York, dealers	4.00- 4.50
St. Louis	4.50- 5.00

FORGE FLASHINGS ☐ ☐

Boston, dealers	6.00- 6.25
Buffalo	10.50-11.00
Cleveland	9.50-10.00
Detroit	8.00- 8.50

FORGE SCRAP ☐ ☐

Boston, dealers	5.00- 5.25
Chicago, heavy	12.50-13.00
Eastern Pa.	9.50-10.00

ARCH BARS, TRANSOMS

St. Louis	12.25-12.75

AXLE TURNINGS ☐ ☐

Boston, dealers	3.00- 3.50
Buffalo	7.50- 8.00
Chicago, elec. fur.	10.50-11.00
Cleveland	7.50- 8.00
Eastern Pa.	9.50-10.00
St. Louis	6.50- 7.00

STEEL CAR AXLES ☐ ☐

Birmingham	12.50-13.00
Boston, ship. point	10.00-10.50
Buffalo	13.25-13.75
Chicago, net	16.00-16.50
Eastern Pa.	16.50-17.00
St. Louis	14.00-14.50

SHAFTING ☐ ☐

Boston, ship. point	12.25-12.50
Eastern Pa.	17.50
New York, dealers	10.75-11.25
St. Louis	11.50-12.00

CAR WHEELS ☐ ☐

Birmingham	9.00- 9.50
Boston, iron deal.	6.00- 6.50
Buffalo, iron	11.00-11.50
Buffalo, steel	13.00-13.50
Chicago, iron	12.00-12.50
Chicago, rolled steel	12.50-13.00
Cincinnati, iron	9.00- 9.50
Eastern Pa., iron	10.50-11.00
Eastern Pa., steel	14.50-15.00
Pittsburgh, iron	12.50-13.00
Pittsburgh, steel	15.00-15.50
St. Louis, iron	8.75- 9.25
St. Louis, steel	10.50-11.00

No. 1 CAST SCRAP ☐ ☐

Birmingham	9.50-10.00
Boston, No. 1 mach.	8.50- 9.00
Boston, No. 2	7.50
Boston, tex. con.	8.50- 9.00
Buffalo, cupola	10.50-11.00
Buffalo, mach.	12.00-12.50
Chicago, agri. net	9.50-10.00
Chicago, auto	10.50-11.00
Chicago, mach net	11.00-11.50
Chicago, railr'd net	10.00-10.50
Cinci., mach. cup	9.50-10.00
Cleveland, cupola	12.50-13.00
Detroit, net	9.50-10.00
Eastern Pa., cupola	11.50-12.50
Pittsburgh, cupola	13.50-14.00
San Francisco, del.	13.50-14.00
Seattle	7.00- 8.50
St. Louis, No. 1	9.00- 9.50
St. L., No. 1 mach.	10.25-10.75

HEAVY CAST ☐ ☐

Boston, del.	6.00- 6.25
Buffalo, break.	9.00- 9.50
Cleveland, break.	9.00- 9.50
Detroit, auto net	10.50
Detroit, auto net	9.50-10.00
Eastern Pa.	11.00
N. Y. break. deal.	6.50- 6.75
Pittsburgh	12.50-13.00

MALLEABLE ☐ ☐

Boston, consum.	10.00-10.50
Buffalo	12.75-13.25
Chicago, R. R.	13.00-13.50
Cincinnati, agri. del.	9.00- 9.50
Cleveland, rail	12.00-12.50
Detroit, auto	11.00-11.50
St. Louis, R. R.	10.50-11.00
Eastern Pa., R. R.	11.00-11.50

RAILS FOR ROLLING ☐

5 feet and over

Birmingham	11.00-11.50
Boston, dealers	8.00- 8.50
Buffalo	12.00-12.50
Chicago	12.50-13.00
Eastern Pa.	12.50-13.00
New York, dealer	7.50- 8.00
St. Louis	10.75-11.25

LOCOMOTIVE TIRES ☐

Chicago (cut)	12.50-13.00
St. Louis, No. 1	10.00-10.50

LOW PHOS. PUNCHINGS ☐

Buffalo	13.25-13.75
Chicago	13.50-14.00
Eastern Pa.	14.50-15.00
Pittsburgh	14.50-15.00

Nonferrous Metal Prices of the Week

Spot unless otherwise specified. Cents per pound

	Copper: Electro., del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin: New York Spot	Straits Tin: New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Chinese Spot, N. Y.	Nickel Cathodes
Jan. 26	9.00	9.12½	7.50	50.75	50.45	3.70	3.55	3.70	*19.00	14.50	35.00
Jan. 28	9.00	9.12½	7.50	50.70	50.40	3.70	3.55	3.70	*19.00	14.50	35.00
Jan. 29	9.00	9.12½	7.50	50.95	50.60	3.70	3.55	3.70	*19.00	14.50	35.00
Jan. 30	9.00	9.12½	7.50	50.92½	50.55	3.60	3.45	3.70	*19.00	14.50	35.00
Jan. 31	9.00	9.12½	7.50	51.10	50.55	3.60	3.45	3.70	*19.00	14.50	35.00
Feb. 1	9.00	9.12½	7.50	51.00	50.50	3.50	3.35	3.70	*19.00	14.50	35.00

*Nominal range 19.00c to 21.00c.

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS	
Baltimore*	2.90c
Boston††	2.95c
Buffalo	3.00c
Chattanooga	3.31c
Chicago	2.95c
Cincinnati	3.15c
Cleveland	2.95c
Detroit	3.03½c
Houston	3.00c
Los Angeles	3.70c
Milwaukee	3.06c
New Orleans	3.30c
New York‡(d)	3.22c
Pittsburgh(h)	2.90c
Philadelphia*	2.90c
San Francisco	3.60c
Seattle	3.60c
St. Louis	3.19c
St. Paul	3.00c
Tulsa	3.25c
IRON BARS	
Portland	3.40c
Chattanooga	3.31c
Baltimore*	3.00c
Chicago	2.75c
Cincinnati	3.15c
New York‡(d)	3.32c
Philadelphia*	2.90c
St. Louis	3.19c
Tulsa	3.25c
REINFORCING BARS	
Buffalo	2.60c
Chattanooga	3.31c
Chicago	2.10c-2.60c
Cleveland(c)	1.97½c
Cincinnati	3.25c
Houston	3.25c
Los Ang., cl.	2.15c
New Orleans	3.50c
Pitts., plain(h)	3.05c
Pitts., twisted squares (h)	3.175c
San Francisco	2.45c
Seattle	3.50c
St. Louis	3.24c
Tulsa	3.25c
Young.	2.30c-2.60c
SHAPES	
Baltimore*	2.95c
Boston††	3.17c
Buffalo	3.25c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.40c
Cleveland	3.31c
Detroit	3.40c
Houston	3.00c
Los Angeles	3.70c
Milwaukee	3.31c
New Orleans	3.55c
New York(d)	3.37c
Philadelphia*	2.95c
Pittsburgh(h)	3.15c
Portland	3.55c
San Francisco	3.55c
Seattle	3.55c
St. Louis	3.44c
St. Paul	3.25c
Tulsa	3.50c
PLATES	
Baltimore*	2.95c
Boston††	3.18c
Buffalo	3.37c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.40c
Cleveland, ¼-in. and over	3.31c
Detroit	3.40c
Detroit, ⅜-in.	3.65c
Houston	3.00c
Los Angeles	3.70c
Milwaukee	3.31c
New Orleans	3.55c
New York(d)	3.40c
Philadelphia*	2.95c
Phila. floor	4.95c
Pittsburgh(h)	3.15c
Portland	3.55c
San Francisco	3.55c
Seattle	3.55c
St. Louis	3.44c
St. Paul	3.25c
Tulsa	3.50c
NO. 10 BLUE	
Baltimore*	3.05c
Boston††	3.25c
Buffalo	3.62c
Chattanooga	3.36c
Chicago	3.05c
Cincinnati	3.20c
Cleveland	3.11c
Det., 8-10 ga.	3.13½c
Houston	3.35c
Los Angeles	3.80c
Milwaukee	3.16c
New Orleans	3.55c
New York	3.27c
Portland	3.75c
Philadelphia*	3.05c
Pittsburgh(h)	2.95c
San Francisco	3.75c
Seattle	3.75c
St. Louis	3.29c
St. Paul	3.45c
Tulsa	3.70c
NO. 24 BLACK	
Baltimore*†	3.51c
Boston (g)	3.90c
Buffalo	3.25c
Chattanooga	4.21c
Chicago	3.85c
Cincinnati	4.05c
Cleveland	3.91c
Detroit	3.98½c
Los Angeles	4.45c
Milwaukee	3.96c
New York	3.85c
Philadelphia*†	3.55c
Pitts.** (h)	3.55c
Portland	4.40c
San Francisco	4.40c
Seattle	4.40c
St. Louis	4.09c
St. Paul	3.695c
Tulsa	4.75c
NO. 24 GALV. SHEETS	
Baltimore*†	4.21c
Buffalo	4.00c
Boston (g)	4.60c
Chattanooga	4.86c
Chicago (h)	4.55c
Cincinnati	4.70c
Cleveland	4.61c
Detroit	4.70c
Houston	4.40c
Los Angeles	5.05c
Milwaukee	4.66c
New Orleans	4.95c
New York	4.50c
Philadelphia*†	4.25c
Pitts.** (h)	4.15-4.45c
Portland	5.00c
San Francisco	5.00c
Seattle	5.00c
St. Louis	4.79c
St. Paul	4.19c
Tulsa	5.10c
BANDS	
Baltimore*	3.15c
Boston††	3.25c
Buffalo	3.42c
Chattanooga	3.61c
Chicago	3.30c
Cincinnati	3.45c
Cleveland	3.36c
Detroit, ⅛-in. and lighter	3.38½c
Houston	3.25c
Los Angeles	3.90c
Milwaukee	3.41c
New Orleans	3.59c
New York(d)	3.62c
Philadelphia	3.15c
Pittsburgh(h)	3.20c
Portland	3.90c
San Francisco	4.05c
Seattle	3.90c
St. Louis	3.54c
St. Paul	3.20c
Tulsa	3.45c
HOOPS	
Baltimore	2.30c
Boston	4.25c
Buffalo	3.42c
Chicago	3.30c
Cincinnati	3.45c
Det., No. 14 and lighter	3.38½c
Milwaukee	3.41c
New York	3.62c
Philadelphia	3.40c
Pittsburgh(h)	3.70c
Seattle	5.60c
St. Louis	3.54c
St. Paul	3.75c
COLD. FIN. STEEL	
Baltimore (c)	3.71c
Boston	3.85c-4.00c
Buffalo (h)	3.55c
Chattanooga*	4.06c
Chicago (h)	3.50c
Cincinnati	3.70c
Cleveland (h)	3.50c
Detroit	3.63½c
Los Ang.(f)(d)	4.95c
Milwaukee	3.61c
New Orleans	4.30c
New York	3.92c-4.42c
Philadelphia	3.73c
Pittsburgh(h)	3.45c
Portland (f)	4.75c
San Fran.(f)(d)	5.95c
Seattle(f) (d)	4.75c
St. Louis	3.74c
St. Paul	3.20c
Tulsa	4.65c
COLD ROLLED STRIP	
Boston, 0.100-in., 500 lb. lots	5.35c
Buffalo	3.39c
Chicago	3.27c
Cincinnati(b)	3.42c
Cleveland (b)	3.20c
Detroit	3.33c
New York	4.70c
St. Louis	3.36c

TOOL STEELS

(Applying on or east of Mississippi river; west of Mississippi 1c up)

	Base
High speed	57c
High carbon, high chrome	37c
Oil hardening	22c
Special tool	20c
Extra tool	17c
Regular tool	14c

Uniform extras apply

(b) Plus straightening, cutting and quantity differentials; (c) Plus mill, size and quantity extras; (d) Minus quant. diff.; (e) New mill classif.; (f) Rounds only; (g) 50 bundles or over; (h) Outside delivery, 10c less.

‡Domestic bars; *Plus quan. extras; **Under 25 bundles; *†50 or more bundles; †New extras apply; ††Base 40,000 lbs. extras on less.

Prices on heavier lines are subject to new quantity differentials; 399 lbs. and less, up 50 cts.; 400 to 9999 lbs., base; 10,000 to 19,999 lbs., 15 cts. under; 20,000 to 39,999 lbs., 25 cts. under; 40,000 lbs. and over, 35 cts. under base.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Jan. 31

Export Prices f. o. b. Ship at Port of Dispatch—By Cable (or Radio)

	British gross tons U. K. ports		Continental Channel or North Sea ports, metric tons	
			Quoted in dollars at current value	**Quoted in gold pounds sterling
PIG IRON	£ s d			£ s d
Foundry, 2.50-3.00 Silicon	$14.98	3 1 6	$13.78	1 14 0
Basic bessemer	13.39	2 15 0*	12.97	1 12 0
Hematite, Phos. .03-.05	15.22	3 2 6	.....	.....
SEMIFINISHED STEEL				
Billets	$26.78	5 10 0	$19.04	2 7 0
Wire rods, No. 5 gage	37.99	7 16 0	36.49	4 10 0
FINISHED STEEL				
Standard rails	$37.74	7 15 0	$44.60	5 10 0
Merchant bars	1.63c	7 10 0	1.15c to 1.20c	3 2 6 to 3 5 0
Structural shapes	1.60c	7 7 6	1.13c	3 1 6
Plates, †¼ in. or 5 mm.	1.74c	8 0 0	1.51c	4 2 6
Sheets, black, 24 gage or 0.5 mm.	2.01c	9 5 0	2.13c	5 16 0††
Sheets, gal., 24 gage, corr.	2.44c	11 5 0	2.38c	6 10 0
Bands and strips	1.84c	8 10 0	1.46c	4 0 0
Plain wire, base	2.01c	9 5 0	1.96c	5 7 6
Galvanized wire, base	2.44c	11 5 0	2.30c to 2.33c	6 5 6 to 6 7 6
Wire nails, base	2.60c	12 0 0	2.11c	5 15 0
Tin plate, box 108 lbs.	$ 4.38	0 18 2	.....	.....

British ferromanganese $85 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d $(43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d		French Francs		Belgian Francs		Reich Marks
Fdy. pig iron, Si. 2.5	$16.43	3 7 6(a)	$13.78	210	$14.38	310	$24.74	62
Basic bessemer pig iron	16.43	3 7 6(a)*	12.14	185	12.76	275	27.73	(b)69.50
Furnace coke	4.26	0 17 6	7.87	120	5.10	110	7.58	19
Billets	26.78	5 10 0	28.21	430	20.42	440	38.51	96.50
Standard rails	1.79c	8 5 0	2.08c	694	2.31c	1,100	2.39c	132
Merchant bars	1.87c	8 12 0	1.68c	560	1.16c	550	1.99c	110
Structural shapes	1.90c	8 15 0	1.65c	550	1.16c	550	1.95c	107.50
Plates, †¼-in. or 5 mm.	1.97c	9 1 3	2.10c	700	1.47c	700	2.30c	127
Sheets, black	2.28c	10 10 0§	2.55c	850‡	1.63c	775‡	2.61c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	2.82c	13 0 0	4.50c	1,500	3.15c	1,500	6.70c	370
Plain wire	2.01c	9 5 0	3.15c	1,050	2.31c	1,100	3.13c	173
Bands and strips	2.03c	9 7 0	1.95c	650	1.47c	700	2.30c	127

*Basic. †British ship-plates. Continental, bridge plates. 24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel. a del. Middlesbrough. b hematite. ††Close annealed

**Gold pound sterling carries a premium of 66.47 per cent over paper sterling.

Bars

Bar Prices, Page 72

Pittsburgh—Merchant steel bars are undergoing somewhat heavier demand, but producers are able to promise bar deliveries within a week to ten days. Both carbon and alloy bars are unchanged at 1.80c and 2.45c, Pittsburgh, respectively.

Cleveland — Bar mills here have increased operations to an average of 75 per cent to meet demand from automobile manufacturers, forge shops on automobile work, agricultural equipment makers and miscellaneous requirements. Leading sellers booked twice as much tonnage in January as in December and three times the amount entered in January last year.

Chicago — Further diversification is developing in steel bar demand, orders being more numerous from small miscellaneous users. Mill are accumulating backlogs in some grades, despite the fact that orders are for delivery during the present quarter. While additional improvement in automotive orders is slight, heavy shipments continue and farm implement manufacturers are taking deliveries in substantial volume.

Boston—Commercial steel, alloy and forging bar demand is steady, but total volume is not large, although some improvement in miscellaneous specifications is noted. Pauly Jail Building Co., New York, has the steel cell work, county jail, Barnstable, Mass., at $31,599, requiring special alloy bars and plates for doors and equipment.

New York—While demand for commercial steel bars is slow cold-drawn steel is moving much more actively.

Effective Feb. 5 class 23 tool steel billets will be reduced 4½ cents to 37.8c, Syracuse, N. Y., and class 23 tool steel bars, 5 cents to 42c, Syracuse. These reductions, it is emphasized, affect only one class and only one basing point.

Philadelphia — Bar rollings are improved, although in most cases demand can be traced either directly or indirectly to automobile activity. Railroads are buying lightly and little tonnage is coming out from shipyards. Commercial steel bars are 1.80c, Pittsburgh, or 2.09c, Philadelphia. Common iron bars are unchanged at 1.99c, Philadelphia.

Case Hardening Service Co., 2281 Scranton road, Cleveland, has been appointed by the Hevi Duty Electric Co., Milwaukee, as its district representative for Ohio, in charge of service and sales of electric heat treating furnaces.

Plates

Plate Prices, Page 72

Pittsburgh — Prospective river barge operators are slow to close on a volume of inquiry which is still considered attractive. Other plate outlets are supporting the market poorly and most plate buying is of miscellaneous small lot orders. Plate mills here are able to promise almost immediate delivery and rolling schedules are practically on a day-to-day basis. The market is 1.80c, base Pittsburgh.

Cleveland — Plate bookings increased moderately during the week, enabling the Cleveland mill to operate at 30 per cent. Railroads are buying a little more material for repairs. Sellers are receiving a considerable number of inquiries for special sizes and analyses of plates. Miscellaneous manufacturing demand appears to be better.

Chicago — While plate demand has improved slightly, business is lighter than in most other products. Except for occasional awards for tanks and government dams, demand recently has been principally for miscellaneous uses and in small lots.

Boston — Miscellaneous demand for plates has improved with an increase in small orders and car lot releases. Practically all orders are for immediate delivery with no indications of buying for stock. Prices are steady at 2.20c, Boston.

New York—Plate inquiry is less active than a week ago although ship repairs call for more material. A lull in oil company buying is believed responsible for the smaller total volume of sales.

Philadelphia—While still spotty, plate demand is further slightly improved. Contributing to recent inquiry is an unusual quantity of ship repair work, resulting from heavy storms along the eastern seaboard. Tank work includes placing of 190 tons for the Continental Distillery Co., here. Plates are 1.90c, Coatesville, Pa., or 1.98½c, Philadelphia.

San Francisco—Western Pipe & Steel Co., Los Angeles, took 650 tons of plates for a 30-inch, 10-gage welded pipe line for the metropolitan water district, Los Angeles. To date this year 6885 tons have been booked, compared with 500 tons for the same period a year ago. New inquiries are slow.

Seattle—Bids have been opened by city officials at Tacoma, Wash., for a $600,000 water system improvement project involving 4000 tons of plates. There is fair demand for plates in small tonnages.

Contracts Placed

800 tons, tanks, Minnesota Mining Co., St., Paul, to Wausau Iron Works, Wausau, Wis.

700 tons, repairs to 20 steel barges for Carnegie Steel Co., Pittsburgh, to American Bridge Co., Pittsburgh.

190 tons, tanks, for Continental Distillery Co. (Publicker Alcohol), Philadelphia, to Chicago Bridge & Iron Works, Chicago.

Unstated tonnage, 100,000-gallon elevated tank on 75-foot four-column tower, county hospital, Middleton, Mass., to Chicago Bridge & Iron Works, Chicago.

Contracts Pending

390 tons, 6-foot pipe line, Diamond Alkali Co., Fairport, O.; bids being taken.

200 tons, tank, Boulder City, Nev.

100 tons, 200,000-gallon standpipe, Paris, N. Y.; bids Feb. 12; W. F. Field Engineers Inc., engineers.

Sheets

Sheet Prices, Page 72

Pittsburgh — Producers of full-finished sheets are withdrawing from the market, being unable to promise deliveries before the close of March. While it has been rumored that some buyers have offered premiums for prompt shipment, this lacks confirmation, although it is known that certain important Detroit buyers have requested preferential positions on early second quarter full-finished rolling schedules. Last week the average of operations in autobody sheet mills was higher than 80 per cent. Many producers are running three full turns daily. Demand from manufacturers of stoves and shelving also is good. American Sheet & Tin Plate Co. has resumed at its Mercer works, Farrell, Pa., after six months' idleness. Hot mills have not resumed, material for finishing being shipped from Gary, Ind.

Cleveland—If prices were subject to change during a quarter this would be decidedly a sellers' market, so far as concerns sheets. The Cleveland mill cannot give delivery before March, and no cold-rolled before the latter part of March, while the producer in an adjacent lake district is booked up solidly for the remainder of this quarter. Both these interests continue operating at 100 per cent. To facilitate delivery trucking is being resorted to in many instances. Demand for enameling

stock for household utilities is fairly active.

If the present strong market for sheets continues, and producers believe it will for several months, higher prices on some grades may be asked for second quarter. Reports are heard of automobile manufacturers offering premiums to obtain quick delivery, but these are believed to refer to drawing extras on full-finished sheets, heretofore waived, which producers now are having less difficulty in obtaining.

Chicago — Sheet mill operations continue to improve gradually, with producers of cold-rolled material generally running at capacity, largely as a result of active automotive demand. Betterment in needs of other sheet consumers is becoming more pronounced.

Boston—Demand for sheets here is largely miscellaneous in character, with some gain in total volume. Container makers in one or two instances are taking slightly heavier shipments.

New York—Sheet demand continues to broaden, with the larger consumers more active now than in a considerable time, particularly manufacturers of electrical devices, barrels, drums and other containers.

Philadelphia — January sheet tonnage substantially exceeded the preceding month for most sellers here. In autobody sheets, contracting here for this quarter appears about concluded.

Buffalo—Sheet mills here are operating at 65 per cent, and will run at this or a higher rate throughout the month. Production in the first quarter this year will exceed that of the combined third and fourth quarters of 1934, it now seems assured.

Cincinnati — Sheet production is close to capacity. Pressure for delivery on full-finished sheets is especially heavy.

St. Louis—Unusually diversified requirements are appearing, and there is more disposition on the part of users to stock up. Stove and implement interests continue to account for heavy tonnages. The movement of galvanized sheets to agricultural areas is the best in several months.

Birmingham, Ala. — Demand for sheets still warrants steady mill operation. Inquiries are being received from agricultural areas.

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Transportation

Track Material Prices, Page 73

Southern Pacific has distributed 26,174 tons of 112-pound rails, awarding 12,559 tons to Columbia Steel Co., San Francisco, 7615 tons to Colorado Fuel & Iron Co., Denver, and 6000 tons to Pacific Coast Steel Co., San Francisco. Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., will roll the tonnage for the Steel corporation subsidiary, Bethlehem Steel Co., Bethlehem, Pa., for the Pacific Coast Steel Co.

Carnegie Steel Co., Pittsburgh, last week began rolling on 24,000 tons of rails for the Norfolk & Western and with a backlog of 30,000 to 32,000 tons, rail mill operations will continue at the Edgar Thomson works, Braddock, Pa., for four to five weeks.

Amtorg Trading Corp., New York, last week placed orders for 3000 solid steel axles and 6000 forged steel wheels, aggregating about 4500 tons, with Carnegie Steel Co., Pittsburgh. The order is for immediate shipment.

American Car & Foundry Co., New York, has taken an order for six

tank cars from the Barrett Co., New York.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has received an order for electrical equipment for nine trolley coaches from the Columbus, O., Railway Power & Light Co.

Chicago Surface Lines plans installation of 11½ street miles of trolley-bus and bus line service in Chicago, requiring the purchase of 40 to 60 new buses. The Chicago, Milwaukee, St. Paul & Pacific, shortly will start installation of air conditioning equipment on 123 passenger cars.

Buses Placed

Eastern Massachusetts Street Railway Co., 42 buses, costing about $420,000, to Mack Motor Truck Co., Boston, subsidiary of Mack Trucks Inc., New York.

Garden State Lines, Passaic, N. J., four White-type intercity, to White Motor Co., Cleveland.

Car Orders Placed

Barrett Co., New York, six tank cars, to American Car & Foundry Co., New York.

Rail Orders Placed

Southern Pacific, 12,559 tons to Columbia Steel Co., San Francisco; 7615 tons to Colorado Fuel & Iron Co., Denver; 6000 tons to Pacific Coast Steel Co., San Francisco. All 112-pound rails.

Wheeling & Lake Erie, Cleveland, 2200 tons of 110-pound, to Carnegie Steel Co., Pittsburgh; unstated tonnage of angle bars to Illinois Steel Co., Chicago.

Rail Orders Pending

Atlantic Coast Line, 5000 tons rails; bids asked.

Seattle municipal railway, 1000 tons No. 1 relayer and angle bars; bids soon.

Wire

Wire Prices, Page 73

Pittsburgh — Specifications for spoke, spring and manufacturing wire increased last week and indicated the automotive trade were purposely building up inventories. Carload prices on wire products at Pittsburgh continue steady.

Cleveland — Recent improvement, due mainly to automobile manufacturers' nut, bolt and spring requirements, is well sustained. Orders from other consumers are light.

Chicago — Wire demand continues active, January sales and shipments showing a marked gain over December and January last year. Mill operations have increased steadily to the best rate in several months. Demand for manufacturers' wire continues brisk, with requirements of some industries, particularly automotive, the largest in several years. Orders from jobbers for wire products are improving.

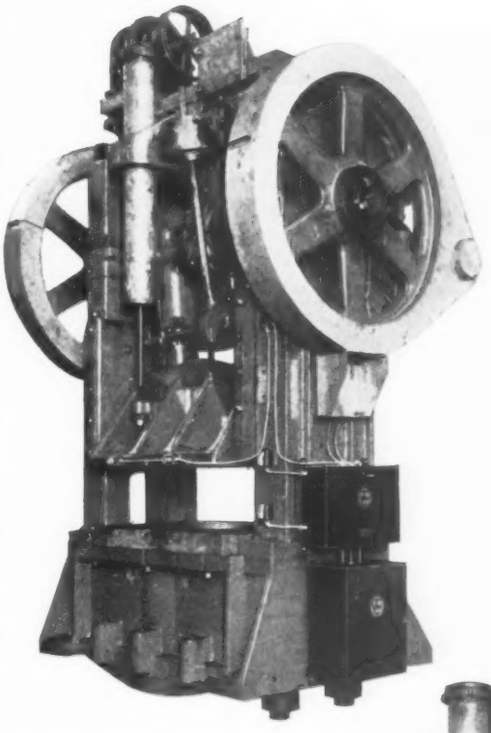
Boston — Wire volume holds the recent improved rate, with some gain in several departments. Spring wire orders are encouraging, with several producers. Specialty volume and manufacturers' wire activity are retained. Quick delivery is requested on much business.

Semifinished

Semifinished Prices, Page 73

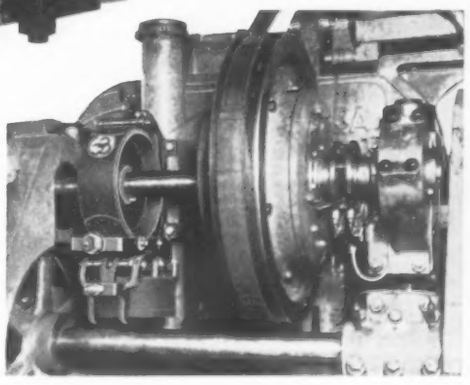
Sheet bar and billet shipments are the best in over eight months. A fair improvement also is noted in wire rods, while skelp shipments are well maintained. Forging quality billets are in good demand for automobile partsmaking shops. Pittsburgh base prices hold at $27 for billets; $28 for sheet bars; $38 for common wire rods, and $40 for combination rods.

New Power Press Control Insures Safety



Safety to the operator is one of the main features of the automatic electric control operation of power presses developed by Clark Controller through the use of automatic control panel and electric brake. The power unit actually running the press has no connection with this control unit.

The safety feature is the non-repeat control system of operating the press. The installation illustrated is on a Niagara press although the same unit could be applied to any similar press. Patent pending.



Above illustration is complete view of press showing the automatic control panel while view at the right shows the electric brake unit.

THE CLARK CONTROLLER CO.
1146 East 152nd St.
Cleveland, Ohio

Shapes

Structural Shape Prices, Page 72

New York—Award of 1650 tons for railroad track depressions in Manhattan features the market.

Although December shipments of fabricated structural steel were 32 per cent larger, bookings during the month declined 36 per cent, compared with the same month last year, according to the American Institute of Steel Construction, New York. Shipments were in a volume comparable to the average monthly shipments the first half of the year, whereas the bookings were 25 per cent less. From this, the institute concludes, the seasonal slump was much later than it was during the year previous.

Pittsburgh—Graham Construction Co., Lancaster, Pa., has awarded 458 tons of structural shapes to American Bridge Co., Pittsburgh, for state highway work in Tioga county on which bids were taken Dec. 28. The American Bridge Co. was also awarded 286 tons in the same letting by B. B. Construction Co., Phillipsburg, Pa. An inquiry for service and emergency gates at Sheffield, Ala., for the Tennessee valley authority will require 1200 tons.

Cleveland — Approximately 2500 tons are pending for three industrial buildings in Ohio on which fabricators have submitted bids, while at present there is little pending in public works. The Ohio highway commission's proposals for Feb. 9 bidding includes one lot of 80 tons for a bridge in Clermont county. Steel & Tubes Inc. has awarded 400 tons for an addition to its mill building, Cleveland.

Chicago—About 800 of the 4000 tons involved in new inquiries is for two industrial plants in this district. Private inquiry otherwise is confined to small lots. Illinois opens bids Feb. 8 on 2300 tons for five bridges. Awards are small and consist almost entirely of bridge work in Illinois and Wisconsin.

Boston—Structural steel lettings approximate 500 tons, including 380 tons for a state hospital building, Taunton, Mass. New inquiry is light.

Philadelphia—Apart from two projects, bids on both of which were opened last week, structural activity is light. No outstanding awards are noted and new inquiries require negligible tonnages. Irwin & Leighton, this city, are low on the general contract for building the naval aircraft plant here. Shape mills are participating in tonnage now being released for a heavy amount of ship repair work developed in this district recently. Shapes are 1.90c, Bethlehem, Pa., or 2.00½c, Philadelphia.

San Francisco—A number of structural awards were placed during the week, requiring lots from 100 to 200 tons and aggregating over 1500 tons. Harnischfeger Sales Corp. booked 250 tons for a 100-ton crane for Los Angeles, and Pacific Coast

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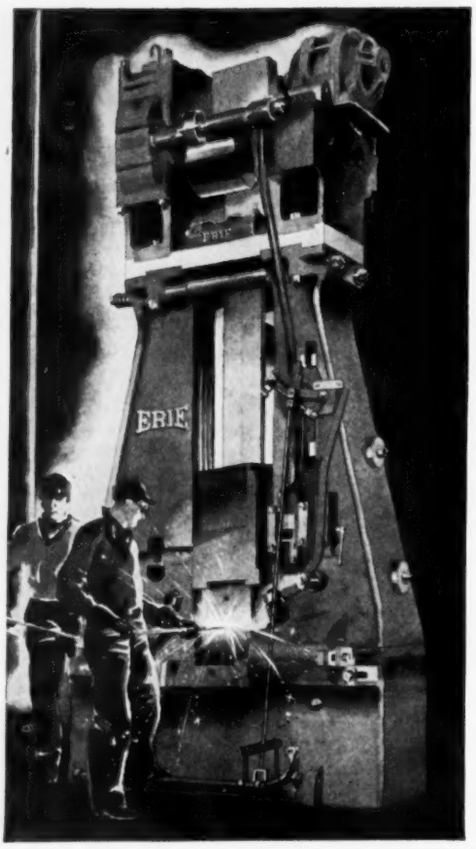

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Shape Awards Compared

	Tons
Week ended Feb. 2	10,052
Week ended Jan. 26	7,746
Week ended Jan. 19	14,222
This week in 1934	15,024
Weekly average, 1934	16,284
Weekly average, 1935	13,660
Weekly average, January	13,660
Total to date, 1934	84,947
Total to date, 1935	65,289

Steel Corp, was awarded 125 tons for a warehouse in Los Angeles and 100 tons for a radio tower at Van Nuys, Calif.

Seattle—The largest tonnage pending consists of 680 tons for the Montana state bridge over Flathead river, Colonial Construction Co., Spokane, Wash., being low for the general contract. Bids have been opened by the reclamation bureau, Denver, for 200 tons of structurals and 40 tons of corrugated sheets for the government warehouse at Coulee, Wash., dam.

Shape Contracts Placed

1650 tons, track depression project, Forty-second to Fifty-third streets, westside Manhattan, New York, to American Bridge Co., Pittsburgh; through P. T. Cox Contracting Co.

1600 tons, dormitories, University of Texas, Austin, Tex. to Mosher Steel & Machinery Co., Dallas, Tex., H. H. Wattinger, Austin, general contractor.

1400 tons, bridge, Gans, Okla., to Wisconsin Bridge & Iron Co., Milwaukee.

770 tons, bridge, NRH-M 40-C-1, McCurtain county, Oklahoma, to Muskogee Iron Works Co., Muskogee, Okla.

570 tons, warehouse, Coca Cola Co., Baltimore, to Ingalls Iron Works, Verona, Pa.; Cogswell Construction Co., general contractor.

400 tons, addition to Steel & Tubes Inc., building, Cleveland, to Truscon Steel Co., Youngstown, O.; through Austin Co., Cleveland.

350 tons, bridge NRH 58-B, Shawnee county, Kansas, to Missouri Valley Bridge & Iron Co., Leavenworth, Kan.

380 tons, state hospital building, Taunton, Mass., to Haarmann Steel Co., Holyoke, Mass.; Thomas O'Connor & Co., Cambridge, Mass., general contractor.

458 tons, state highway bridge, route 22, Tioga county, Pennsylvania, to American Bridge Co., Pittsburgh; through Graham Construction Co., Lancaster, Pa.

415 tons, bridge approach, Lemont, Ill., to Duffin Iron Co., Chicago.

300 tons, bridge, Red River, Wis., to McClintic-Marshall Corp., Bethlehem, Pa.

286 tons, state highway bridge, route 692, Bedford county, Pennsylvania, to American Bridge Co., Pittsburgh; through B. B. Construction Co., Phillipsburg, Pa.

255 tons, beam bridge NRS 404A, Douglas county, Illinois, to Mississippi Valley Structural Steel Co., Decatur, Ill.

255 tons, state highway bridge RC-3591, Otsego and Delaware counties, New York, to Harris Structural Steel Co., New York.

250 tons, buildings for government, Yellowstone National Park, Wyoming, to unnamed interest.

206 tons, Kookia bridge, Idaho national forest; bids to bureau of roads, Ogden, Utah, Feb. 5.

155 tons, four bascule girders, Monroe, La., to American Bridge Co., Pittsburgh.

150 tons, state highway bridge, Akron, Colo., to American Bridge Co., Pittsburgh.

150 tons, two bridges, Delaware, Lackawanna & Western railroad; bids eb. 7 on material delivered, f.o.b. Newark, N. J.

102 tons, state highway bridge, Southwestern boulevard, Erie county, New York, to McClintic-Marshall Corp. and Kalman Steel Corp., Bethlehem, Pa.; Stento & Serafini Construction Co. Inc., Binghamton, N. Y., general contractor.

100 tons, shapes and bars, county jail addition, Barnstable, Mass., to Eastern Bridge & Structural Co., Worcester, Mass., and Truscon Steel Co., Youngstown, O.; W. J. Handley Co., Fitchburg, Mass., general contractor.

100 tons, bridge, Cowling, Ill., to Vincennes Bridge Co., Vincennes, Ind.

Unstated tonnage, shapes and bars school, Bourne, Mass., to J. E. Cox Co., Fall River, Mass., and Truscon Steel Co., Boston; L. M. Witherall & Sons, Taunton, Mass., general contractor.

Shape Contracts Pending

2300 tons, five state bridges, Illinois; bids Feb. 8.

2000 tons, approximately, naval aircraft factory, Philadelphia; Irwin & Leighton, that city, low on general contract; approximately 650 tons of reinforcing bars also required.

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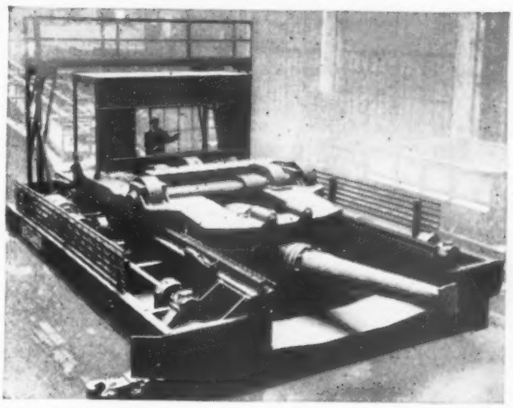

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1400 tons, New York Central railroad track depression project, Fifty-fourth to Sixty-fourth streets, Manhattan, New York; Corbetta Construction Co., low.

1200 tons, high school, Tottenville, Staten Island, N. Y.; bids Feb. 7 to board of education, New York.

1200 tons, service and emergency gates, Sheffield, Ala., for Tennessee valley authority.

1000 tons, school, Tottenville, Staten Island, N. Y.

810 tons, high school, Olean, N. Y.

800 tons, postoffice, Phoenix, Ariz.; bids Feb. 15.

750 tons, public school No. 149, Queens, New York; bids Feb. 7.

700 tons, high school, Bayonne, N. J.

680 tons, Flathead river, Montana state bridge; Colonial Construction Co., Spokane, low.

475 tons, warehouse, Fleischmann Malting Co., Chicago.

400 tons, postoffice, Wheeling, W. Va.; bids Feb. 20.

350 tons, plant addition, Wander Co., Villa Park, Ill.

315 tons, garage, *Daily News*, Brooklyn, N. Y.

300 tons, addition to Gummed Products Co., building, Troy, O.

200 tons, government warehouse at Coulee, Wash., dam; bids in.

150 tons, Greyhoud bus terminal, New York.

135 tons, including machinery, Bonneville, Oreg., locks span; McRae Bros., Seattle, general contractor.

Reinforcing

Reinforcing Bar Prices, Page 73

Pittsburgh — General contractors, including Graham Construction Co., Lancaster, Pa., and B. B. Construction Co., Phillipsburg, Pa., are awarding small lots of reinforcing bars for state highway work in the Dec. 28 letting. Distributors quote 2.05c, Pittsburgh, on carload lots of new billet bars, while the rail steel bar market is 1.90c on the same basis.

Cleveland — Only small lots are being sold, demand from municipal and state work projects being lighter than at any time in the past 12 months. In a memorandum explaining the rseason for rejecting bids on 1000 tons for the Muskingum, O., conservancy district dams, the United States engineer at Zanesville, O., states the difference in freight rates from the farthest to the nearest shipping points is $7.80 a ton, while bids were uniform, "constituting prima facie evidence that the quoted prices are excessive." Suppliers say only code prices were submitted.

Chicago — The outlook for increased demand for reinforcing bars is favorable despite recent quietness which is attributed largely to adverse weather. Contractors defer placing material for road work, while action on several other projects is postponed temporarily.

Boston—New inquiry for reinforcing steel is small, limited to highways and bridges. Commercial and industrial building requirements are light.

New York—Small-lot inquiry has improved due to postoffice requirements. Largest tonnage pending is 1000 tons for track depressions and an elevated highway section, Manhattan, on which bids are in.

Philadelphia—Approximately 650 tons of reinforcing bars will be required for the naval aircraft factory here, on which Irwin & Leighton, this city, are low bidders. Little new tonnage is in prospect before the end of this month.

San **Francisco**—In the first four weeks of the year 11,328 tons were booked as compared with 6527 tons in the corresponding period in 1934. Soule Steel Co. booked 432 tons for a building for the Continental Can Co., Oakland, Calif. Bids have been opened on 475 tons for enlarging the O'Shaughnessy dam, Hetch Hetchy project, San Francisco. The Los Angeles metropolitan water district will open bids Feb. 11 for 7030 tons. A school in San Francisco, requiring 1200 tons, will be up for bids soon.

Seattle—While the market is not active prospects are improving. More than 200 tons for the Seattle light building will be placed shortly.

Reinforcing Steel Awards

380 tons, 75,000 squares noncorrosive reinforcing fabric, United States engineer, Memphis, Tenn., to Copperweld Steel Co., Glassport, Pa. Caravel Industries Corp., New York, awarded 500,000 wire rope clips and clip parts at $30,710.04, delivered.

432 tons, Continental Can Co. plant, Oakland, Calif., to Soule Steel Co., San Francisco.

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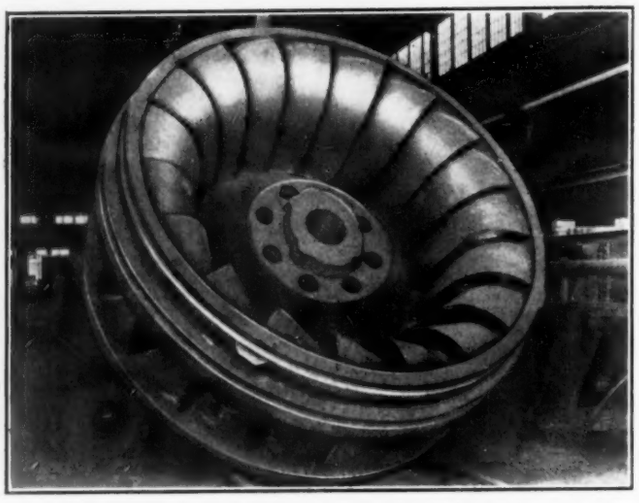

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Concrete Awards Compared

	Tons
Week ended Feb. 2	1,562
Week ended Jan. 26	7,940
Week ended Jan. 19	2,489
This week in 1934	2,227
Weekly average, 1934	4,084
Weekly average, 1935	3,898
Weekly average, January	3,898
Total to date, 1934	21,676
Total to date, 1935	19,489

350 tons, state highways, Morris and Passaic counties, New Jersey, to Igoe Bros., Newark, N. J.; through J. P. Burns, Dumont, N. J.

100 tons, Shark river bridge approaches and River avenue widening, Belmar, N. J., to Stultz-Sickles Co., Newark, N. J.

Unstated tonnage, 1,590,000 square feet, galvanized wire fabric, United States engineer, New Orleans, to C. T. Patterson Co., New Orleans; bids Jan. 7.

Reinforcing Steel Pending

7030 tons, metropolitan water district, Los Angeles, specification 87; bids Feb. 11.

1200 tons, Marina high school, San Francisco; bids soon.

965 tons, reinforcing fabric and bars state highway projects, Louisiana; bids Feb. 13.

650 tons, naval aircraft factory, Philadelphia; Irwin & Leighton, that city, low on the general contract; tonnage originally estimated at 400 tons.

475 tons, enlargement O'Shaughnessy dam, San Francisco; bids opened.

400 tons, apartment house, Bronx (New York).

350 tons, Glenn Park school, San Francisco; bids opened.

235 tons, substructure pier No. 25, New York.

200 tons, high school, Bayonne, N. J.

200 tons, government barracks, Carlisle, Pa.; bids Feb. 6.

158 tons, state highway work in three counties in California; bids Feb. 13.

150 tons, sewage disposal plant, Radnor township, Pennsylvania; McCabe Bros., Philadelphia, low for general contract.

150 tons, Seattle seawall project; bids soon.

125 tons, bridge, Elk river, Alabama, Tennessee valley authority project.

105 tons, Flathead river bridge, Montana; Colonial Construction Co., Spokane, low.

100 tons, grade separation, Fort Wadsworth, Staten Island, N. Y.

100 tons, state paving job, Washington; general contract awarded.

Unstated, state bridges in Coos, Josephine, Morrow, Multnomah and Union counties, Oregon; bids in.

Cold Finished

Cold Finished Prices, Page 73

Pittsburgh—No check to continued heavy buying of cold-finished steel bars has appeared. The market appears steady at 2.10c, base Pittsburgh; 2.15c, Cleveland or Gary, Ind.; 2.20c, Buffalo; 2.30c, Detroit; and 2.35c, eastern Michigan.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 73

Heavier automotive buying of bolts, nuts and small rivets lifted the January total of specifications at Pittsburgh to a level comparable with December. Automobile manufacturers are specifying further ahead, releases having been received at Cleveland for shipment April 1. Demand from this source is strong, miscellaneous requirements are increasing, but railroads are buying sparingly. Labor difficulties at one implement manufacturer's plant last week led to suspension of shipments. Demand at Chicago is gaining but not as rapidly as in centers more dependent on automotive buying.

Producers generally quote 70-10-10 off list for carriage and machine bolts and 2.90c, Pittsburgh or Cleveland, 3.00c, Chicago, for large rivets. The small rivet discount is 70-5 off.

Pipe

Pipe Prices, Page 73

Chicago—Cast iron pipe still is in an extremely dull market, but with moderately favorable prospects for better activity with the approach of more favorable weather. While a fairly large number of orders are in prospect, closing on such business is deferred. Inquiry still is awaited from the Chicago sanitary district for work now being planned.

Pittsburgh — Approach of open weather is expected to place several pending line pipe projects in a more favorable position. Meanwhile the market's chief support is coming from a wide range of miscellaneous buying in practically all tubular products. January shipments were as good or slightly better than December. A leading interest reports a 25 to 30 per cent increase in 1935 specifications to date over the same period of 1934.

Cleveland—While producers note a substantial increase in demand for steel pipe, distribution still is restricted largely through warehouses for miscellaneous maintenance work. The market for cast pipe is quiet.

Boston—Cast pipe buying is sluggish. Few municipalities buying under yearly contracts have issued inquiries while others, planning replacements and extensions this year, have not yet completed plans. Merchant steel pipe demand, although light, is steady. A fair number of heating and plumbing contracts taking steel pipe is pending.

New York—Cast pipe inquiry is heavier with the city closing Feb. 5, 7 and 15 on projects taking close to 1500 tons, to be placed by contractors. Substantial volume of steel pipe also is included in these specifications. Yonkers again takes bids

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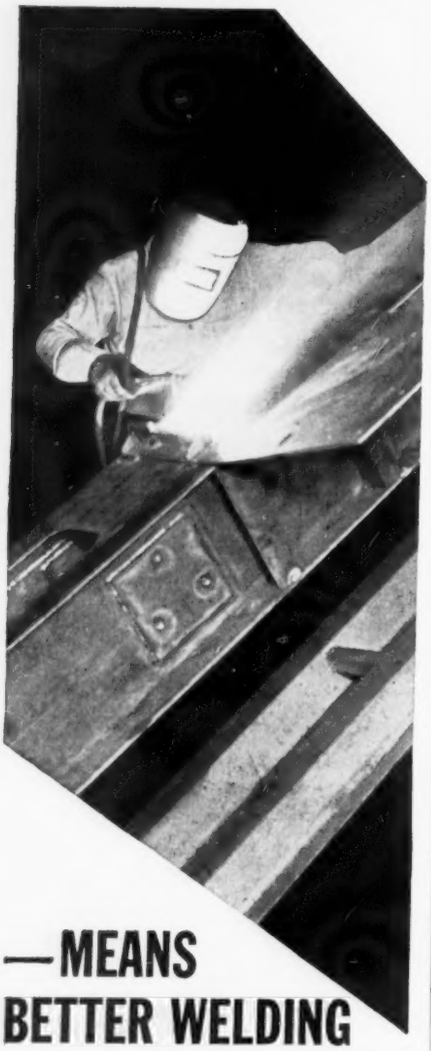

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THE MARKET WEEK

on 1950 tons of cast pipe and fittings. Awards during the week were approximately 1150 tons, including 900 tons for a Brooklyn sewer.

Philadelphia—Substantial demand for oil country goods from the Texas fields is noted here, with a district tubemaker now operating at virtually 100 per cent capacity, having put on a third shift last week.

Birmingham, Ala. — Numerous small tonnage orders have been received by cast pipe producers warranting fairly steady operation. PWA projects are being augmented by some private business.

San Francisco—Cast iron pipe orders so far this year have been light, but some large lots for municipalities are expected to be up for figures shortly. New inquiries include 750 tons for Los Angeles and 367 tons for Redwood City, Calif. Winnemucca, Nev., plans to purchase 825 tons in the near future.

Seattle—With federal loans in prospect many cities in this area are planning extensions and replacements. The largest tonnage pending is at Spokane, Wash., where bids were opened Feb. 1 for the Veradale project requiring 472 tons.

Cast Pipe Placed

4500 tons, New Orleans, to United States Pipe & Foundry Co., Burlington, N. J., $135,514; National Cast Iron Pipe Co., Birmingham, Ala., $47,037; American Cast Iron Pipe Co., Birmingham, $2148; Florence Pipe Foundry & Machine Co., $9071; Michigan Valve & Foundry Co., Detroit, $4256.

1650 tons, Sweetwater, Tex., to American Cast Iron Pipe Co., Birmingham, Ala.; Ludlow Valve Co., Rensselaer, N. Y., awarded specialties.

300 tons, 30-inch with fittings, sewer, Brooklyn, N. Y., to Donaldson Iron Works, Emaus, Pa.; Mill Basin Construction Co., general contractor.

450 tons, 16-inch and under, Hartford, Conn., to R. D. Wood & Co., Philadelphia.

400 tons, 6-inch and under, natural gas line, Jackson to Canton, Miss., to United States Pipe & Foundry Co., Burlington, N. J.

240 tons, 4 and 6-inch, Oakland, Calif., to United States Pipe & Foundry Co., Burlington, N. J.

225 tons, 8 and 12-inch, Burlington, N. J., to United States Pipe & Foundry Co., Burlington.

165 tons, 24-inch and under, Newark, N. J., to Warren Foundry & Pipe Co., Phillipsburg, N. J.

113 tons, 4 and 8-inch, San Rafael, Calif., to United States Pipe & Foundry Co., Burlington, N. J.

Steel Pipe Placed

140 tons, 20-inch welded steel discharge pipe, United States engineer, St. Louis, to Treadwell Construction Co., Midland, Pa.

100 tons or more, 6-inch and under, natural gas line, Jackson to Canton, Miss., to Mississippi Foundry & Machine Co., Jackson, Miss.

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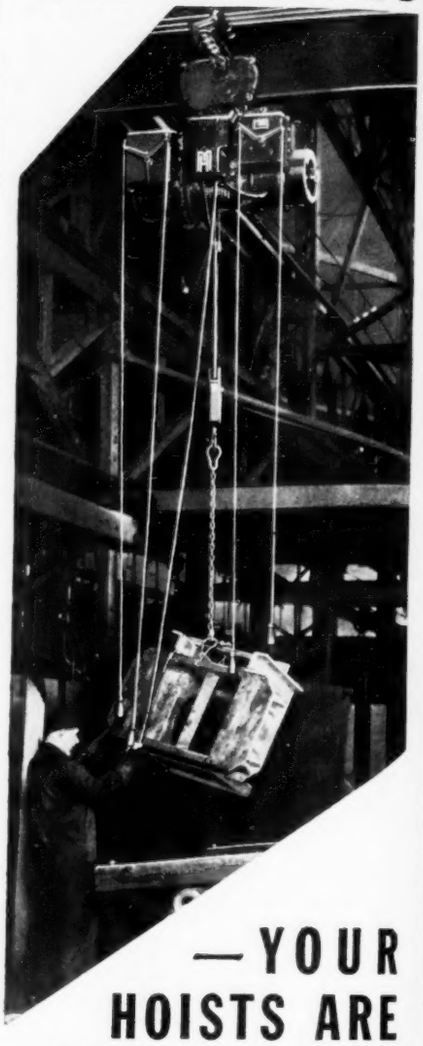

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Cast Pipe Pending

1900 tons, 30-inch and under, with fittings, Yonkers, N. Y.; bids Feb. 14, original bids rejected.
1500 tons, 30-inch and under, New York, contractors to buy; bids Feb. 5, 7 and 15.
825 tons, 4 to 12-inch, Winnemucca, Nev.; bids soon.
750 tons, 6-inch, class 250, Los Angeles; bids in.
601 tons, 6 and 12-inch, Pasadena, Calif.; United States Pipe & Foundry Co., Burlington, N. J., low.
570 tons, 20-inch, Greenfield, Mass.
367 tons, 10 and 12-inch, Redwood City, Calif.; bids Feb. 4.
320 tons, enlargement O'Shaughnessy dam, San Francisco; bids in.
295 tons, 16-inch, Los Angeles, specification 1600; bids in.
115 tons, Torry, Utah; bids soon.

Strip Steel

Strip Prices, Page 73

Pittsburgh—Deliveries on hot-rolled strip are at least three weeks delayed and one producer last week had accumulated sufficient backlog for at least 48 turns. Another Pittsburgh strip mill is preparing to open a 12-inch strip mill, which, built in 1930, has never operated. Deliveries on most tempers of cold-rolled strip are now so far in arrears that the market is considered sold out through first quarter. A large part of present strip buying is to accomodate a program the automobile interests have adopted to build up a large bank of parts against contingencies. Base prices on strip are 1.85c, Pittsburgh, for hot-rolled and 2.60c, Pittsburgh, for cold-rolled.

Cleveland — Specifications for hot and cold-rolled strip are being received for delivery in March, and the Cleveland strip mill continues to operate at capacity. Generally, hot-rolled strip cannot be delivered before two weeks, and cold-rolled before three weeks from date of order. A strong demand is noted for hot-rolled from cold-rolling plants. As usual in a sellers' market, there is some discussion of higher prices for second quarter. Practically all current business is with automobile manufacturers.

Chicago—Strip demand continues active under stimulus of heavy automotive requirements and expanding needs of miscellaneous small users. Cold-rolled strip is relatively more active than hot-rolled.

New York—Narrow strip is in best demand since the first of the year although the tonnage is relatively light. Prices are steady.

Boston—Cold-rolled strip is more active, especially in wider widths. Hot strip demand has also improved. Some rollers have accumulated better backlogs, resulting in steadier operations. Buying covers a broad range, automotive needs leading.

Philadelphia—Steel strip is in dull demand for narrow widths. This is attributed in part to stripping of wider sizes of sheets at many consuming plants. Prices are unchanged at 1.85c, Pittsburgh, or 2.14c, Philadelphia, for hot strip and 2.60c, Pittsburgh, or 2.89c, Philadelphia, for cold strip.

Tin Plate

Tin Plate Prices, Page 72

Pittsburgh—Canmakers are placing more tin plate orders for shipment at mills' convenience, raising tin plate mill operations 20 points to 85 per cent. Some producers are purposely holding down rolling schedules while the smaller independents are rolling all their orders promptly.

New York—Tin plate specifications continue heavy. Leading trade authorities predict canners' requirements this year will range from 20 per cent over 1934 to a new high record. Canners began the year with light stocks and are in better financial position than in some time.

Pig Iron

Pig Iron Prices, Page 74

Pittsburgh — Melters in this district buying more than a carload or two of iron at a time are still exceptional, although the foundry melt has improved slightly. Large inquiries for basic or bessemer iron which might be expected to be developing at this time are lacking. Output of the Shenango Furnace Co.'s merchant stack is largely being taken up by ingot molds and Davison Coke & Iron Co.'s Neville Island furnace is down for complete relining. Prospects are that the latter will not be in a position to resume blast before another two months. Pig iron prices here are being observed without change on the following levels, Pittsburgh district furnace: Basic $18, bessemer $19 and foundry grades, $18.50.

Cleveland—New bookings continue to shrink, while shipments are increasing. Heavier deliveries than ex-

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pected last week raised the January tonnage 70 per cent over that of December. This also is approximately the January increase over January last year. Automotive, agricultural implement and heating equipment manufacturers are taking most of the iron currently shipped. General Motors units still are operating on iron purchased and delivered last year, and have stocks sufficient to carry them into second quarter.

Chicago — January shipments of pig iron exceeded expectations, the movement being about 80 per cent heavier than in December and showing a similar gain over January, 1934. Business already booked for February assures a continuance of the upturn in shipments which now has extended for six months. Forward buying this quarter has been more general than was true during the preceding several quarters, with most foundries scheduled at a fairly active rate for the ensuing two months. Farm implement plants continue active, though a strike at the South Bend, Ind., plant of the Oliver Farm Equipment Co. has suspended operations there.

Boston — Pig iron sales are heavier, including close to 600 tons for a Worcester, Mass. heavy machine builder. The latter was low-phosphorus iron, going to a domestic seller. Sales during the week are estimated at close to 1000 tons with some increase in small orders. Consumer stocks are generally low.

New York—Although some sellers of pig iron reported a fair improvement recently, tonnage has not picked up since the end of the inventory period in the manner anticipated. Orders for more than 100 tons are few, with most buying still for single-car lots. Prices are steady.

Philadelphia — Although pig iron shipments showed an improvement in January over the preceding month, the increase was disappointing to most sellers and at moment there is little outstanding tonnage in any direction. Prices are unchanged.

Buffalo — January shipments of iron were the best in eight months. February is opening at a good rate. Anticipating an active first half, local producers are planning to double output of iron this quarter. While most consumers are fairly well covered, shipments are at a rate indicating heavy melt in comparison with that of the last half of 1934.

Cincinnati — Shipments of pig iron are holding at unchanged levels which represent an increase in the melt due chiefly to automotive activity. Recent sales have been in small lots, for immediate needs.

St. Louis — While new commitments for pig iron continue small, shipments are heavy, the January total exceeding that of the preceding month and the same period in 1934 by wide margins. Sellers report prospects promising for the balance of this quarter. In adjacent Illinois territory implement manufacturers have increased operations, which as a whole are at a higher rate than at any time since 1928.

Birmingham, Ala., — With little, if any, addition to the accumulated stock of pig iron from week to week, production is steady, five blast furnaces being in operation, three on foundry and two on basic.

Toronto, Ont.—While no changes developed in the pig iron markets during the week, business is holding well up to the average for the year. Melters are adhering strictly to a hand-to-mouth buying schedule. Daily melt is holding around 35 to 40 per cent. Production is unchanged with three stacks blowing and one banked; daily output is about 1200 tons.

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Scrap

Scrap Prices, Page 75

Pittsburgh — The heavy melting steel market here softened 50 cents last week to a representative range of $13 to $13.50, caused by the overbought condition of most consuming mills. A fairly large volume of country scrap has been offered so that scrap brokers have been able to cover on old orders with ease. An important Wheeling, W. Va., mill remains out of the market. Important railroad lists are to be closed this week and include the Pennsylvania for Feb. 6 and the Baltimore & Ohio, Feb. 4.

Cleveland—Dullness rules in the local market for steel and iron scrap, with some movement on contracts but no new buying. Prices are steadier following purchase of 50,000 tons of heavy melting steel by a leading valley interest at the market. Prices in the Valleys are slightly higher as a result.

Chicago—Quiet in iron and steel scrap is in contrast to the rising trend in steelmaking operations. One mill recently purchased 10,000 tons of No. 1 heavy melting steel at $11.75,

a reduction of 25 cents from the previous top of the market, but sellers find little material available at $11.50 and are offering as high as $11.75 in covering old sales. Railroad offerings continue light and in view of heavy scrap consumption at open-hearth plants, steady or stronger prices are looked for.

Boston — Scrap prices are firm in New England with steelworks meeting export quotations. The Worcester, Mass., consumer pays $9.25 and $8.50 for heavy melting steel grades, delivered. Most export activity is for No. 2, with $8.50, dock, having been paid for tonnage, although considerable is being laid down at $8.25.

New York—The higher quotation in the price range is more frequently paid for heavy melting steel for export, $9.25, barge, for No. 1 and $7.75 for No. 2. Movement has been slowed by adverse weather. Most export activity is for No. 2, close to 70,000 tons having been booked recently for Italy. Domestic business is dull.

Philadelphia — Scrap prices are leveling off and in stove plate there has been a slight reduction to $8.50 to $9, delivered. All other grades are unchanged. Trading in this district is relatively light but at Baltimore the leading consumer has closed on a heavy tonnage of No. 1 and No. 2 steel at $11 and $10, respectively. No new export buying has been done since the recent purchase of 50,000 tons of No. 2 steel for Italy. With the local and export markets at the existing level it is considered doubtful if much of this will be supplied from this district at present. A leading scrap consumer at Johnstown, Pa., has recently purchased a round tonnage of No. 1 melting steel at $12.50, delivered, an unchanged price.

Buffalo — An active market continues for scrap although immediate demands of some consumers have been satisfied. Small lot purchases are reported to have been made at $12.50 for No. 1 and $11 for No. 2 heavy melting steel. Both prices are up 50 cents from the previous quotations. Lackawanna has purchased a further sizable tonnage of No. 1 melting steel at the unchanged price of $12, delivered.

Detroit — Scrap prices are unchanged though heavy production from local automotive plants tends to cause quotations to become slightly easier. Offsetting this situation is the capacity rate of production by local steelworks.

Cincinnati — Sales of iron and steel scrap during the past 10 days, reported slightly below the recent peak prices, have failed to bring lower quotations here although a softness in the market continues.

St. Louis—Iron and steel scrap prices are steady at the recent moderate decline. Buying is mainly in small lots, an exception being the acquisition of 3000 to 4000 tons by an east-side mill on a basis of current quotations, for the remainder of this quarter.

Birmingham, Ala.—Prices have not been changed and the situation is steady, with some heavy melting steel moving.

Seattle—Stocks of melting steel scrap here are low and the price is up about 50 cents, ranging around $9.25, although it is reported that domestic sales were done as low as $7.50 recently. Exporters anticipate a stronger market in Japan shortly which will bring material from the interior for shipment to the Orient.

Toronto, Ont. — Slow improvement is reported in iron and steel scrap. Heavy melting steel is said to be moving freely to the Hamilton district and with the completion of the new electric furnace at Burlington, Ont., it is expected there will be a substantial demand for other grades. Iron grades have a steady call from foundry consumers, but no large tonnage buying is reported.

Warehouse

Warehouse Prices, Page 76

Pittsburgh — Pittsburgh jobbers booked more business in 20 days of January than in the entire month of December. Warehouse prices are unchanged. Jobbers here do not look for adoption of the mill small-lot quantity extras on plates and structurals which comes up for reconsideration in March.

Cleveland—While warehouse tonnage in January represents a substantial gain over December, for most sellers, some slackening in number of orders was noted by several last week. Sales have been well distributed, indicating a diverse demand. Leading warehouse interests have taken out vendors' licenses, in accordance with the new Ohio retail sales tax, but relatively little material sold by them is subject to tax.

Chicago — January was a moderately better month in warehouse sales than December and January,

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1934. Lighter products continue to move relatively better than heavy materials. Prices are unchanged.

Boston—Price revisions on cold-finished bars from warehouse include a reduction on squares of one-half cent per pound, placing squares on the same basis as rounds and hexagons. Flats have been reduced 65 cents per 100 pounds, making the pound base price 3.85c.

New York—Warehouse volume has improved. A few jobbers in January surpassed the previous month after a slow start, but in general sellers fell a trifle short of December. Orders are small, but rather numerous. In and around the Brooklyn district, foreign steel, notably bars, offers sharp competition.

Philadelphia — Fair tonnage is being placed with jobbers, with more than usual from the railroads. Railroads, in fact, are placing more business with warehouses than with mills. Jobbers' prices are unchanged.

Cincinnati — Sales by warehouses here during January were better than for any one month in 1934, gains attributed chiefly to diversified industrial demand.

St. Louis—Distributors report requirements are in larger volume, though individual orders remain light.

Seattle—Warehouse business has improved, but consists of small lots. There is a fair turnover of bars, plates, shapes and sheets. Contractors for Coulee and Bonneville dams are making heavy purchases.

Metallurgical Coke

Coke Prices, Page 73

By-product foundry coke is in slightly better demand, but beehive furnace and foundry grades show little life. Beehive domestic coke continues under unsettlement in eastern markets due to low priced imported material. Foundry by-product coke is in heavier demand at Chicago, at prices unchanged from January levels. At Cincinnati domestic grades were more active. St. Louis foundries are calling for larger shipments, January bringing better tonnage than December. Birmingham, Ala., cokemakers are meeting an increased demand.

Quicksilver

New York—Quicksilver prices are unchanged and demand is slow. Small lots of 15 to 24 flasks, inclusive, are $74, a virgin flask of 76 pounds, but round lots of 100 flasks are down to $72.50.

Ferroalloys

Ferroalloy Prices, Page 74

Ferromanganese sales in January were the best month since last May or June. Further improvement may be recorded this month. The market is $85, duty paid, Atlantic and Gulf ports. Domestic spiegeleisen, 19 to 21 per cent, also is moving more freely, with prices unchanged at $26, furnace, on lots up to 50 tons, and $24 on quantities of 50 tons and over.

Steel in Europe

Foreign Steel Prices, Page 76

London — (By Cable) — Fresh activities have appeared in the pig iron trade of Great Britain and exports also are expanding but low prices are necessary, owing to Continental competition. The steel market is maintaining its level and export demand is improving. South America and South Africa have placed orders for rails and a contract for plates for Russia has been booked. Some business from Manchukuo is expected as a result of activities there by the British mission.

The Continent reports export trade quiet but with an expanding tendency, especially to Egypt, North America and China. German export trade is quiet.

Coke By-Products

Coke By-Product Prices, Page 73

New York—Demand for distillates is heavy, especially toluol and xylol of which lacquermakers are taking a good part of current shipments. Benzol shipments are steady, but less active, compared with toluol. Some distributors are unable to take spot orders. Sulphate of ammonia releases are heavier at unchanged prices. Industrial demand for phenol continues satisfactory. Naphthalene specifications against contracts are up slightly.

Nonferrous Metals

Nonferrous Metal Prices, Page 74, 75

New York—Weakness in lead was the outstanding feature of the nonferrous metal markets last week. Reductions of $2 a ton were made Wednesday and Friday bringing the prices to the basis of 3.50c, New York. Other metals were quiet and steady.

Copper—Sales were smaller than had been hoped for and total allocated for January amounting to 27,055 tons, fell short of equalling the "normal" book. However, this represented the best buying in several months and the trade is optimistic.

Lead—American Smelting & Re-

An experience of 33 years—a third of a century—backs Pittsburgh's finer

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fining Co. announced $2 a ton reductions on Wednesday and Friday with St. Joseph. Lead and other sellers following the decline. Prices at the weekend were 3.35c, East St. Louis, and 3.50c, New York. Demand was light and not well distributed which accounted for the lower levels.

Zinc—Prime western held unchanged at 3.70c, East St. Louis, despite surface quietness of demand. Buying has been for immediate needs so the outlook for increased purchasing is favorable.

Tin—Straits prices held remarkably steady for a metal so sensitive to outside influences. Trading was quiet with spot quoted around the 51.00c level. Supplies of tin for prompt delivery continue tight. The increase in world's visible supply was disappointing in the trade as a cut of about 1000 tons had been expected.

Antimony—Only small-lot buying interest was noted and prices held unchanged on the basis of 14.50c, duty paid, for Chinese spot.

Aluminum—Improved demand for virgin aluminum was noted with prices unchanged at 19.00c to 20.00c for ninety-nine per cent plus.

Mirrors of Motordom

(*Concluded from Page* 22)

and F. E. Stanley built their last car in 1927, but a new organization, the Stanley Steam Motors Corp., is attempting to raise capital through the sale of stock in order to start production at Chicago.

Not sufficiently flexible for passenger car use to compete with the modern gasoline engine, the promotors hope that economy of operation of the steamer will interest truck and bus operators. John Brause engineer for the old Stanley Motor Carriage Co., is associated with the new corporation.

The auto show at Chicago last week produced a 60 per cent gain in sales over 1934. Attendance increased 35 per cent.

Reo's exports last year were the largest in the company's history and 120 per cent larger than in 1933. Unfilled orders on Jan. 1 were double those of a year ago.

LAST week's production of 73,527 units was almost double that of the first week of January. General Motors contributed 21,407 to this total, Ford 25,550 and Chrysler 18,025.

Chevrolet's January total was 60,000 units, of which 36,000 were standard models, and its February schedule calls for 70,000, or 10,000 more than last February.

Chrysler shipped 80,000 cars in January, against 28,000 a year ago, and will ship 80,000 this month, compared with 30,000 last February. Plymouth shipments were half of this total, and will be half of February.

Hudson production in January was 10,000, a gain of 6800 over last January. The February schedule is 10,000, a gain of 3500 over last February.

Dodge retail sales between Jan. 1 and 26 were 7589, against 3301 in the like period of 1933.

Financial

(*Concluded from Page* 19)

of the Corporation, after charges but prior to the preferred dividend, was $10,234,413. The similar showing for the first three quarters of 1934 was a loss of $6,989,965, net of $5,350,241, and deficit of $9,826,767, respectively.

In 1934 the Corporation averaged 189,900 employes, compared with 172,577 in 1933. Payrolls totaled $210,503,000, against $163,149,503, while average hourly earnings of employes increased from 59 cents in 1933 to 70 in 1934.

BETHLEHEM IN BLACK FOR 1934

Bethlehem Steel Corp. earned $411,099, after all charges, in the fourth quarter, compared with a loss of $2,400,126 in the third quarter. The final showing for 1934 was a profit of $550,571, against a loss of $8,735,723 in 1933.

During the year the net reduction in funded debt was $5,222,144, and cash expenditures for additions and improvements totaled $2,627,047. Gross sales and earnings for 1934 aggregated $166,957,632, a gain of $46,000,000, while orders on hand Dec. 31 totaled $56,817,681.

INLAND BETTERS SHOWING

Inland Steel Co., Chicago, reports net income of $550,073 in the fourth quarter, compared with loss of $53,476 in the third quarter. For 1934, Inland had a net income of $3,730,332, contrasted with net of $166,693 for 1933.

SUPERIOR 1934 LOSS UP

Superior Steel Corp., Pittsburgh, reports net loss of $264,865 in 1934, compared with 1933 net loss of $245,939. December quarter loss was $95,746, against fourth quarter of 1933 loss of $31,217.

SCULLIN HALVES 1933 LOSS

Scullin Steel Co., St. Louis, reports net loss of $304,926 in 1934 after all charges, against loss of $609,325 in 1933. This is after charges of $281,055 on first mortgage bonds and debentures.

OTHER FINANCIAL REPORTS

Caterpillar Tractor Co., Peoria, Ill., net of $3,651,190 in 1934, against $302,716 in 1933.

Page-Hersey Tubes Ltd., Toronto, Ont., operating profit of $779,850 in 1934, highest since 1931.

Buckeye Steel Casting Co., Columbus, O., net of $181,198 in 1934; loss of $365,148 in 1933.

Transue & Williams Steel Forging Corp., Alliance, O., 1934, loss of $99,636; 1933, loss of $125,061.

Warren Foundry & Pipe Co., Wharton, N. J., 1934, net of $351,858; 1933, net of $130,918.

Virginia Iron, Coal & Coke Co., Roanoke, Va., 1934 loss of $24,682, after charges, against loss of $84,-

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519 in 1933. December quarter net profit was $21,603, against net loss of $22,978 in same quarter of 1933.

Transportation

ASSOCIATION of American Railroads, Washington, is going into research in equipment and materials in a big way. First, it has set up a research advisory board of three, on which are Dr. Karl T. Compton, president of M. I. T., Cambridge, Mass.; Dr. Harold G. Moulton, president of Brookings institution, Washington; and Dr. A. A. Potter, dean of the engineering schools, Purdue university, Lafayette, Ind.

In turn, this board has chosen Lawrence W. Wallace, of the W. S. Lee Engineering Corp., Washington, director of equipment research, to investigate methods and materials relating to motive power and cars. Previously, Mr. Wallace has been with the American Engineering Council, Diamond Chain & Mfg. Co., and many railroads.

TEST NEW "FLYING YANKEE"

"The Flying Yankee," first streamline train for New England railroads, will be taken over by the Boston & Maine and Maine Central for a trial run Feb. 9. The train is of stainless steel, powered by a 600-horsepower diesel engine, built by the E. G. Budd Mfg. Co., Philadelphia, and the engine by the Winton Engine division, General Motors Corp., Cleveland.

Here and There In Industry

BUCYRUS-ERIE CO., South Milwaukee, Wis., has one of the largest orders it has received in years for excavating machinery, to be used for stripping a rock quarry in Brazil. It consists of an electrically-operated dragline excavator with boom 250 feet long and a 12-yard bucket. It will weigh 900 tons and require 32 cars for shipment.

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Johns-Manville, 294 Madison avenue, New York, has taken over sale of Pittsburgh Steel Co.'s steel-tex reinforcing material and electrically welded reinforcing mesh.

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Judson Mfg. Co., Oakland, Calif., Carlos A. Mass president, has changed its name to Judson Steel Corp. It operates an open-hearth plant and rolling mills.

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Perfect Circle Co., Hagerstown, Ind., manufacturer of piston rings, made a record in 1934 for production of rings, with a total of 57,788,000. Increased production of new cars and heavy replacement demand brought this peak.

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Detroit Rocking Electric Furnace, 825 West Elizabeth street, Detroit, has made an arrangement with the Birmingham Electric Co., Birmingham, Eng., for the manufacture of its furnace under the name Birlec Detroit rocking furnace. This opens the British Empire to the use of these furnaces.

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Interlocking Fence Co., Morton, Ill., has opened a branch office at 126 St. Clair avenue, St. Louis, to serve southern Illinois, Missouri and southern Iowa.

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Theodore Geissmann & Co. Inc., Chicago, factory sales agent, has been appointed district sales representative for the Bayonne Bolt Corp., Bayonne, N. J.

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Erman-Howell & Co. Inc., dealer in iron and steel scrap, has moved its general offices from its yards to 332 South Michigan avenue, Chicago. Yard operations continue at 300 West Eighty-seventh street.

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Miller & Co., Chicago, have opened a branch office at 1010 Pine street, St. Louis, for the sale of Woodward pig iron, northern iron, coke and alloys. The office is in charge of J. Robert Nicholas and Norman H. Persons.

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Warner Gear Co., Muncie, Ind., manufacturer of gears, is close to its alltime employment peak, with nearly 2000 persons on its payroll. Present production exceeds any previous January. John M. Simpson is vice president and general manager.

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Capital City Culvert Co., Madison, Wis., manufacturer of corrugated metal culverts, has been taken over by new interests, with present personnel retained. A. P. Jensen, Jackson, Mich., is newly elected president and Lloyd Frame, Sandusky, Mich., vice president. K. A. Johnson remains as secretary and treasurer.

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A. O. Smith Corp., Milwaukee, has booked an order for oil refinery vessels for Shell Petroleum Corp., St. Louis, including 11 electrically-welded cracking stills ranging from 7 to 11 feet in diameter and 40 to 75 feet long. Shipments begin March 15. An export order taken by the Smith company calls for 20 large stills for the Dutch West Indies. The payroll at the end of January was about 5200, compared with 3700 men 90 days ago.

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Meehanite Metal Corp., Pittsburgh, announces the following foundries have now taken out licenses to manufacture all grades of Meehanite metal: Wehrle Co., Newark, O.; Florence Pipe Foundry & Machine Co., Florence, N. J.; Warren Foundry & Pipe Co., Phillips-

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burg, N. J.; G. M. Hay, Glasgow, Scotland; and Etablissements Zickel-Dehaitre, Paris, France.

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Struthers-Wells Co., Warren, Pa., is moving its Chicago office to the Peoples Gas building, 122 South Michigan avenue, Chicago, effective Feb. 9.

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Eavenson, Alford & Hicks, Pittsburgh, mining engineers, have moved their offices to the Koppers building, twentieth floor.

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Gilby Wire Co., Newark, N. J., has changed its name to Wilbur B. Driver Co. No change in the company's organization or business is made.

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Premier Sheet Metal Co., 409 North Jefferson street, Milwaukee, has passed to the sole ownership of Theodore Groleau, who will continue business in the same location. J. G. Harding has retired from part ownership.

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Heil Co., Milwaukee, has booked an order from the Standard Oil Co. of New Jersey for 97 aluminum tanks for trucks, to be mounted on modified Chrysler airflow chassis. The company is also building oil transportation equipment for the Texas Corp., Pan-American Oil Co., Wadhams Oil Co. and Socony-Vacuum Oil Co.

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Weirton Coal Co., a subsidiary of the Weirton Steel Co., Weirton, W. Va., has purchased 200 acres of Pittsburgh seam coal at a reported price of $80,000, located in Luzerne township, Fayette county, near Millsboro, Pa. The tract is on the Monongahela river and is contiguous to other coal properties owned by the Weirton Coal Co. It was purchased from the Peter C. Loucks heirs at Pittsburgh.

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De Laval Separator Co., New York, has been awarded two additional contracts for complete lubrication systems by the United Engineering & Foundry Co., Pittsburgh.

The lubrication equipment for each individual system, consisting of a De Laval centrifuge for maintaining the condition of the oil, main oil circulating pump in duplicate, maintenance cycle circulating pump in duplicate, main oil reservoir tank equipped with cooling coils, pressure tank, sight flow and sight feed fittings, as well as electric siren, will be installed in connection with the new 20½ x 56 x 84-inch cold reversing mill, two skin pass mills and 19 x 49 x 56-inch 4 high, three stand, tandem cold strip mill, now being built for the Ford Motor Co. by the United Engineering & Foundry Co.

Equipment

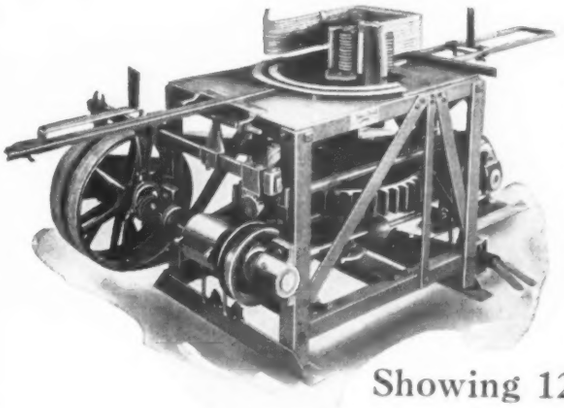
Chicago—Machinery and equipment sellers are encouraged by a moderate pick-up in sales during January, as well as by continued improvement in inquiries. January business in most instances was heavier than that of December, as well as being larger than a year ago. An important feature of recent activity is the diversification in demand for metalworking machinery. Occasional purchases are appearing from railroads, the Santa Fe being in the market for several tools, but the carriers generally are not inclined to make extensive purchases. Business in small tools has increased steadily. The Rock Island, Ill., arsenal is expected to share in additional machine tools to be purchased next month by the army ordnance department. Foundry equipment is more active, both in sales and inquiries compared with a year ago.

Pittsburgh—Detroit Steel Corp., Detroit, owned and operated by Crane-Shrage Steel Co., Detroit, has placed an order for a four-high, single stand, 24-inch cold strip mill with United Engineering & Foundry Co., Pittsburgh. Among prominent new rolling mill inquiries in this district are a 44-inch blooming mill for Jones & Laughlin Steel Corp.'s Aliquippa, Pa., works, and request for figures on revamping Carnegie Steel Co.'s Edgar Thomson works at an estimated cost of $6,000,000. Export inquiries at the present time include both a large merchant and a hot-strip mill for Japan, and Amtorg Trading Corp., New York, is active on a continuous hot-strip mill for the Dnieperstroy works in Russia. Award is being made by Bethlehem Steel Co. on its 79-inch continuous hot-strip mill for Lackawanna (Buffalo) works, and it is reported that a leading Pittsburgh equipment maker is in line for the order.

Cleveland—In line with the upward swing of most industrial indices, sales of machinery and equipment in January were unusually heavy and well diversified, one dealer reporting about 40 per cent more business than in January of last year. While a temporary lull appears to have developed the first week of this month, it is not considered indicative of a downward trend. An Alliance, O., interest is reported to be coming into the market shortly for a number of heavy machine tools. The Yoder Co. here has received an order from Tube Products Ltd., Birmingham, Eng., for a 3½-inch electric-weld tube mill, with roll equipment for various sizes of tubing.

New York—Shepard-Niles Crane & Hoist Corp., Montour Falls, N. Y., is low on two 10-ton, 66-foot span, overhead cranes for the Brooklyn navy yard and is expected to receive the

The Kardong Stirrup Bender



This bender is the result of our 20 years experience in the manufacture of reinforcing steel benders. One man can easily turn out four-bend stirrups from ⅜" stock at the rate of 300 or more per hour thus keeping labor costs at a minimum. A Handy bender for small slab bars and miscellaneous bending.

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Showing 12 ⅜" stirrups bent in one operation

Kardong Brothers, Inc.

Minneapolis, Minn.

contract. A substantial volume of machinery and plant equipment has been figured, but buying is confined largely to one or two tools at a time. Activity, both inquiry and orders, thus far this quarter has been fully as great as last quarter which experienced the best volume in 1934.

Boston—Except for government activity, new inquiry for machinery is less active. Sales are generally for one or two tools at a time, but numerous shops have substantial backlogs, mostly those recently awarded equipment for arsenals. Shops making engines and other airplane equipment in the Hartford, Conn., district are active.

Construction and Enterprise

New England

LAWRENCE, MASS.—Avite Products Inc., Manchester, N. H., has acquired the former Prospect mill of the American Woolen Co. here, and will convert it into a chemical plant at a cost of about $28,000.

New York

BUFFALO—Buffalo Housewrecking & Salvage Co. has taken over the plant and equipment of the Buffalo branch of the Barber Asphalt Co. and will use the new property for expansion of its scrap metal business.

SYRACUSE, N. Y.—Clancy Mfg. Corp. has been formed to manufacture tools and machinery. Articles of incorporation were filed by Hancock, Dorr, Kingsley & Shove, Syracuse, N. Y.

Pennsylvania

MEADVILLE, PA.—Hookless Fastener Co. has plans in progress for an addition to its factory, and bids will probably be taken in April. The cost is estimated at $375,000. Wilbur Watson & Associates, 4614 Prospect avenue, Cleveland, architects.

HOMESTEAD, PA.—Loretto C. Geary, secretary, school district of Homestead, will take bids Feb. 12 for furnishing and erecting one firebox riveted steel boiler at the Fifth ward school building.

Ohio

CHESTER, O.—Otis Mfg. Co., manufacturer of building paper, asphalt, tar and paper felts, is planning to spend $30,000 for equipment and housing facilities to be used in the manufacture of a new product. E. C. Otis is president.

CLEVELAND—Powhatan Mining Co., Union Trust building, will build a coal conveyor and tipple and improve its harbor on the Ohio river near Powhatan Point, O.

CLEVELAND—Steel & Tubes Inc., Henry Wick, vice president in charge of operations, 224 East 131st street, subsidiary of the Republic Steel Corp., has announced plans for a 40,000-square foot addition to its plant. The addition will represent an investment of approximately $125,000. Construction will begin at once.

WOOSTER, O.—Weldless Tube Co., subsidiary of Timken Steel & Tube Co., Canton, O., is rehabilitating its plant.

Michigan

BIRMINGHAM, MICH.—City officials are considering construction of a city-owned power plant to cost about $75,000.

DETROIT—McLeod Steel Corp., 8747 Brandt, has been incorporated to deal in steel, iron and scrap, by Earl McLeod, 5553 Allendale avenue.

GRAND RAPIDS, MICH.—Hamilton & Weber, engineers, have completed plans for construction work and are revising plans for equipment for the power house addition and alterations to be constructed at Grand Haven, Mich. Estimated cost $70,000.

OVID, MICH.—Detroit Creamery Co. is installing approximately $25,000 worth of new equipment at its plant.

PORT HURON, MICH.—Grand Trunk railway is planning to rebuild immediately a part of its car shop repair plant damaged by fire. Cost of rebuilding this portion of plant is estimated at $20,000.

SAGINAW, MICH.—Foundry of the Chevrolet Motor Co. was recently damaged by fire.

Indiana

EVANSVILLE, IND.—Georgeal Waste Products Inc., 201 Seventh avenue, has been organized to deal in scrap steel, iron and other scrap metals, by Heiman Trockman, Louis Trockman and Albert P. Trockman.

LAFAYETTE, IND.—Nusite Steel Producers Inc. has been formed to process high speed steel and tools by O. P. Van Alstine, resident agent, W. S. Nusbaum and William Roth.

Illinois

CHICAGO—Wander Co., 180 North Michigan avenue, is taking bids on an addition to its plant at Villa Park, Ill., to cost about $250,000. The company manufactures food products.

CHICAGO—Compressed Air Power Units Corp., 201 North Wells street, has been incorporated by Reuben L. Pearson, August Glassi, Pietro Maniscalco, to manufacture compressed air and power devices. Correspondent: Armstrong & Spannon, 201 North Wells street.

DECATUR, ILL.—Wabash railroad, H. E. Watts, passenger traffic manager, has announced a $146,000 air-conditioning program to include all principal trains of the line. The work is being done in the Wabash shops here.

ROCKFORD, ILL.—Contour Hosiery Mill Co., 1616 South Main street, is having plans prepared for a 1-story addition to its hosiery mill, 41 x 58 feet. Bradley & Bradley, Brown building, are architects.

Alabama

CHILDERSBURG, ALA.—City has plans for a pumping plant and 100,000-gallon reservoir and sewerage system. John M. Gilfillen, engineer, 619 North Tenth street, Birmingham, Ala.

SCOTTSBORO, ALA.—City, J. D. Snodgrass mayor, will receive bids Feb. 11 for water and sewer improvements.

SHEFFIELD, ALA.—City, W. H. Richeson mayor, plans electric distribution system. Lide & Adler, Woodward building, Birmingham, Ala., engineers.

District of Columbia

WASHINGTON—Bureau of supplies and accounts, navy department, will

Wire

High Carbon—Low Carbon
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open bids Feb. 15, schedule 4194, on motor-driven tool-post electric grinders.

WASHINGTON—Metcalf & Eddy, Boston, are preparing plans for the construction of various units of the $8,000,000 sewage treatment plant to be built by the District of Columbia commissioners. Bids will be taken March 15 for pumping station and grit chamber structures; April 1, preliminary sedimentation tanks; May 15, pumping station equipment and sludge digestion tanks; June 1, power plant and equipment.

Florida

DAYTONA BEACH, FLA.—City has applied to PWA for $385,000 loan for waterworks. Robert & Co., Atlanta, Ga., consulting engineers.

Georgia

ATLANTA, GA.—Brooks Foundry & Machine Co., 521 Marietta street Northwest, will build an addition to its plant.

ATLANTA, GA.—Georgia Power Co., Electric building, has 1935 budget of $10,987,967, of which $2,135,000 will be for improvements and extensions.

AUGUSTA, GA.—City, R. E. Allen mayor, is planning to erect an addition to its present water and sewer system to cost approximately $100,000.

Kentucky

FRANKFORT, KY.—Frank Messer & Sons Inc., 2515 Burnet avenue, Cincinnati, has contract for 7-story addition for George T. Stagg Co., for storage and distribution, estimated to cost $100,000. Carl J. Kiefer, consulting engineer, Schmidt building Cincinnati.

LOUISVILLE, KY.—Kentucky Brewing Co., G. W. Abell, president, Fifteenth and Hill streets, is planning erection of a bottling plant to cost about $50,000, and will install modern machinery.

MAYSVILLE, KY.—Hatfield Campbell Creek Coal Co., Union Trust building, Cincinnati, plans a coal handling plant on the Ohio river at Maysville.

Maryland

BALTIMORE — Fairfield - Western Maryland Dairy Co., Linden avenue, and Dolphin street, has let contract to Avon Construction Co., 216 East Lexington street, for erection of 1-story boiler house addition.

FINKSBURG, MD.—Thomas Ward Distilling Co. plans to build an addition to its distillery at an estimated cost of $40,000.

HAGERSTOWN, MD.—Hull Mfg. Co., has been incorporated to manufacture tools, by Harold M. Porter and Amos F. Eves.

North Carolina

CHARLOTTE, N. C.—Hudson Silk Knitting Co., M. E. Pierson, president, has an 8-acre site for erection of a knitting mill, including a boiler house. Estimated cost $350,000.

HIGH POINT, N. C.—Premier Brewing Co. has been incorporated with capital of $500,000, by Grattan Foy and George L. Stansbury; will erect a brewery with annual capacity of 50,000 barrels.

LOUISBURG, N. C.—Hobbs-Ford Stave Co. has been incorporated by E. C. Bulluck, Louisburg, N. C., and C. W. Slagle Jr., American building, Baltimore, to operate a woodworking plant.

ROARING RIVER, N. C.—Panel and veneer plant of the Roaring River Furniture Corp. was recently damaged by fire.

TARBORO, N. C.—City has voted $53,000 bonds for constructing waterworks system.

Virginia

RICHMOND, VA.—Koiner Distilling Co., care J. L. Koiner, Koiner Mills, near Richmond, Va., plans erection of a distillery on Hermitage road, at approximate cost of $30,000.

Missouri

ST. LOUIS—Griesedieck Bros. Brewery Co. is expending $75,000 for improvements to its plant at 1926 Shenandoah avenue.

ST. LOUIS—Monsanto Chemical Co., 1700 South Second street, will alter and erect an addition to its 1-story boiler house and engine room, at a cost of $100,000. Stone & Webster Engineering Corp., builder and architect.

Arkansas

HARRISON, ARK.—City will vote soon on issuance of $130,000 bonds for erection of power plant.

HOT SPRINGS, ARK.—H. A. McGuire & Co., Memphis, Tenn., is low bidder on the new sewage disposal plant for this city, and A. O. Jones, Opelousas, La., was low bidder on a smaller sewage disposal plant here.

West Virginia

BELLE, W. VA.—Givaudan-Virginia Inc., manufacturer of perfumes and other synthetic chemicals, has acquired a tract adjacent to the plant of the Belle Alkali Co. here, and plans construction immediately of a factory. Plans provide for a complete manufacturing unit with research laboratories, etc.

Oklahoma

CUSHING, OKLA.—City has approved issuance of $280,000 power plant bonds.

Texas

FORT WORTH, TEX.—Allis-Chalmers Mfg. Co., Milwaukee, has taken an order for complete equipment of a new 3600-barrel flour mill and a 300-barrel corn mill here for the Burrus Mill & Elevator Co., subsidiary of the Tex-O-Kan Flour Mills Co., Dallas, Tex. Contract for the building has been let to Jones-Hettelsater Construction Co., Kansas City, Mo. The Burrus company will also build a 500,000-bushel grain elevator at Fort Worth, doing its own construction work.

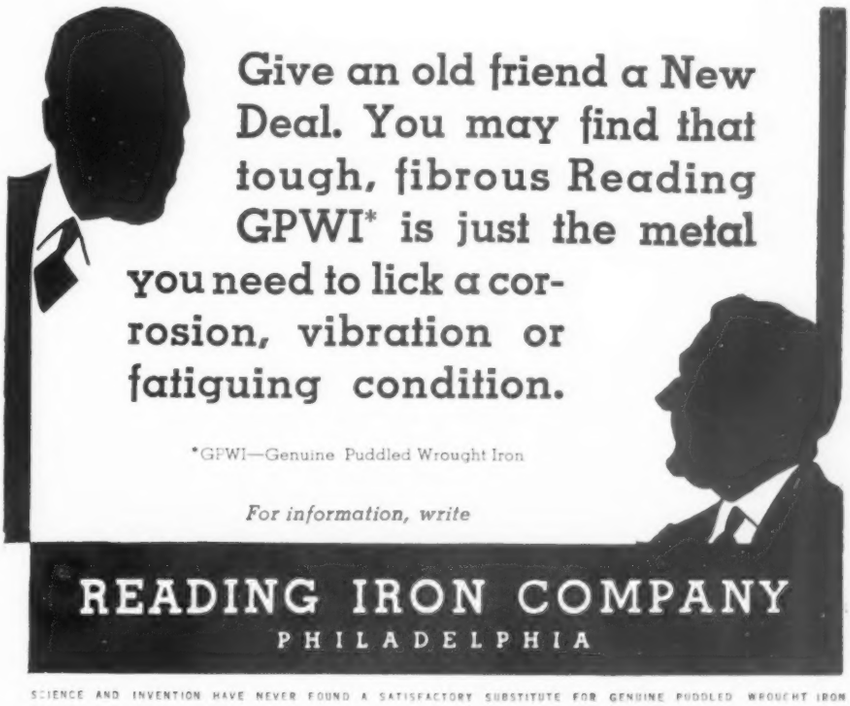
HOUSTON, TEX.—Fehr Bakery, 4100 Leland avenue, is considering erection of a $50,000 addition to its plant. Tellepsen Construction Co., 3900 Clay street, contractors.

HOUSTON, TEX.—General American Tank Storage & Terminal Co., Hugo Epstein president, 230 South Clark street, Chicago, plans starting work immediately on a $1,000,000 oil terminal on a 50-acre site at the Houston ship channel.

Wisconsin

APPLETON, WIS. — Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis., will invest $25,000 or more in modernizing building and re-equipping power house of Appleton paper mill.

MILWAUKEE—Wesley Steel Treat-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ing Co., 1333 West Pierce street, has been granted permit to build a 1-story shop addition. Fred Rankel is consulting engineer.

PHILLIPS, WIS.—Phillips Mfg. Co., has been incorporated to manufacture auto accessories, by Marthe, Royal and F. M. Linderman.

SUPERIOR, WIS.—Great Northern Railway Co., Railroad building, St. Paul, has started work on repairing the Superior ore dock at a cost of $150,000.

TWO RIVERS, WIS.—Aluminum Goods Mfg. Co., Manitowoc, Wis., manufacturer of aluminum ware, auto specialties, etc., has started construction of an addition to its annealing plant here.

Minnesota

MINNEAPOLIS—Flour City Welding Co., corner of Lake street and Third avenue, south, has started construction of a 1-story welding shop addition, 20 x 66 feet.

MINNEAPOLIS—Marquette Mfg. Co., manufacturer of automotive and shop equipment, is planning to open eight factory branches in the South, including one at Greensboro, Charlotte and Goldsboro, N. C.; Washington; Richmond, Va.; Greenville and Columbia, S. C.; and Atlanta, Ga.

ROCHESTER, MINN.—Public Utility board, A. J. Lentfer secretary, has had plans completed for an addition to the municipal light and power plant to cost $100,000. A turbine and boiler unit will be installed later at a cost of about $350,000. Burlingame & Hitchcock, Sexton building, Minneapolis, are consulting engineers for the power plant equipment.

South Dakota

RAPID CITY, S. DAK.—Aerozep Corp. has been incorporated with capital stock of $50,000 to manufacture a new type of aircraft to be known as aerozep, by Carl H. Loocke, Lorrin L. Hanson and Alfred S. Nystrom.

SPENCER, S. DAK.—City will soon take bids for construction of waterworks system, including pumping equipment and a 50,000-gallon elevated steel water tank. Albert Chenoweth, 320 Paulton building, Sioux Falls, S. Dak., is engineer.

Iowa

BOONE, IOWA—City council has been petitioned to call a special election to vote on construction of a municipal light and power plant to cost $800,000. P. R. Pulver is city clerk.

CEDAR FALLS, IOWA—Clay Equipment Corp. has started production of a new galvanized metal window frame having a tilting feature which provides ventilation both above and below the frame.

DUBUQUE, IOWA—Klauer Mfg. Co., manufacturer of metal culverts, rotary type snowplows, etc., plans construction of a diesel generating plant to cost $40,000 for supplying power requirements.

MUSCATINE, IOWA — Muscatine Metallic Vault Co. has been incorporated with capital of $50,000 to manufacture metallic vaults, by A. F. Grensing, president, and Fred C. Grensing, secretary.

RED OAK, IOWA—Red Oak Sales Corp. has been incorporated to manufacture and deal in machinery, appliances and equipment. George L. Ruston is president.

Nebraska

BEATRICE, NEBR. — Southeastern Nebraska Public Power District, J. E. Fisher secretary, has signed loan and grant agreement with PWA for funds to construct a $575,000 electrical distribution system.

Colorado

DENVER, COLO.—Reclamation bureau will receive bids Feb. 7 for a 7½-ton crane for the government warehouse at Coulee Dam, Wash., Feb. 15 for two motor-driven shaft pumping units for the Klamath project in Oregon, and Feb. 18 for two pumping units for the Owyhee project in Oregon and Idaho.

Wyoming

YELLOWSTONE PARK, WYO.—United States National Park Service, Washington, will soon take bids for extensions and improvements in hydroelectric generating plants on Panther and Indian Creeks, Yellowstone Park, including installation of new equipment. Appropriation of $237,000 has been authorized. Roger Toll, Mammoth Hot Springs, Yellowstone Park, is superintendent in charge of plants.

Montana

DEER LODGE, MONT.—Chicago, Milwaukee, St. Paul & Pacific Railway Co., 80 East Jackson boulevard, Chicago, has started construction of a 2-story ice storage plant, 36 x 72 feet, having an 800-ton storage capacity.

HELENA, MONT.—PWA officials have approved a grant of $826,000 for the Rock Creek water conservation project in Carbon county, which includes three lake reservoirs to supply irrigation to 55,000 acres of land.

MISSOULA, MONT.—Montana Flour Mills Co. has acquired the Ravalli mills and is installing new machinery and equipment.

Idaho

MOSCOW, IDAHO—Preston Machine Shop is installing new equipment. Harry Frazier and E. O. Styner are the new owners.

Pacific Coast

LOS ANGELES—Nelli Art Bronze Foundry has obtained a permit to build an office and foundry building here at 3430 Union Pacific avenue.

CASCADE LOCKS, OREG.—Fire recently caused damage to the plant of the P. J. McGovern Fish Co., including the powerhouse and all equipment.

SEATTLE—General Sheet Metal Inc., 3622-28 East Marginal way, has been organized by E. L. Comings and associates.

SEATTLE—George F. Horluck, president, Horluck Brewing Co., is having plans prepared for a modern bottling plant. Construction will start within about 60 days.

SEATTLE—Bids will be received Feb. 7 by the board of public works for furnishing two centrifugal pumping units, 750-gallon per minute each, one 1250-gallon per minute unit and one 300-gallon per minute unit.

TACOMA, WASH.—Plant of the Atlas Foundry & Machine Co. recently sustained damage by fire.

VANCOUVER, WASH.—Great Western Malting Co. has awarded contract to Boughan-Hammond Co., Portland, Oreg., for construction of plant to cost about $350,000.